

City of Birmingham, Alabama

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MUNICIPAL SEPARATE STORM SEWER SYSTEM

NPDES PERMIT NUMBER: ALS000032

FISCAL YEAR 2018-2019

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) 2019 ANNUAL REPORT

PERMIT YEAR

OCTOBER 1, 2018-SEPTEMBER 30, 2019

JANUARY 31ST, 2020



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CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature:

Name: Joshua D. Yates

Title: Stormwater Administrator

Date: January 31st, 2020

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STORMWATER MANAGEMENT PROGRAM EVALUATION

PROGRAM OBJECTIVE: The Clean Water Act is a comprehensive set of programs and requirements designed to address the complex problems caused by a wide variety of pollution sources. A cornerstone of the Act is the National Pollutant Discharge Elimination System (NPDES), regulating the discharge of pollutants into waters of the U.S. The City of Birmingham has been issued a NPDES Phase I Municipal Separate Storm Sewer System (MS4) Permit (No. ALS000032), dated March 1, 2018, for the operation of its MS4. That permit, which became effective on March 1, 2018, and expires February 28, 2023 outlines a number of controls and activities to effectively prohibit the discharge of non-stormwater into the MS4 and reduce the discharge of pollutants from the MS4 to the maximum extent practicable. Today, within the City of Birmingham, several water resource segments do not meet beneficial use requirements. As a result, they have been placed on the State's Section 303(d) list of impaired water bodies and either have or are scheduled to have total maximum daily loads (TMDLs) established to further control pollutants from being discharged into City waterbodies. To achieve overall water quality improvement for those water resources within watersheds of the City of Birmingham, the following objectives are foundational:

- 1. Development of a strong partnership with the State of Alabama, Department of Environmental Management.*
- 2. Facilitate achievement of established TMDLs for streams and creeks within the jurisdictional purview of the City of Birmingham that will ultimately lead to removal of these resources from the impaired waters list.*
- 3. Reduce discharge weighted total suspended solids concentration during a 5-year permit cycle.*
- 4. By combination of both pollution control and preventative approaches, reduce or remove pollutants to the maximum extent practicable from the MS4.*
- 5. Development and implementation of watershed basin-wide strategies to address water quality and quantity problems in City of Birmingham watersheds.*
- 6. Implement Stormwater Protection Ordinance to control discharges to and from the City's MS4 by the establishment of a stormwater protection ordinance.*
- 7. Implement Post Construction Program to meet and exceed permit requirements.*



MAJOR FINDINGS

During NPDES Stormwater Permit reporting year 2018-2019, the City of Birmingham identified several major findings, which either did or could have far reaching implications on the City's Stormwater Management programs, which are described below.

STREAM SEDIMENTATION

The picture above, is of Village Creek taken in August 2019, depicts sedimentation, this is a concern to City maintenance crews and to the public. The Stormwater Management Division and Public Works Department is working to address sediment loading in portions of the Village Creek Watershed and with the U.S. Army Corps of Engineers to develop flood control alternatives in the Valley Creek Watershed that could

potentially help with addressing stream sedimentation.

WATER QUALITY MONITORING

This reporting period now includes more than six-full years of water quality monitoring in Birmingham's creeks. The foundation of the City's instream water quality monitoring program has been to identify instream peak concentrations of specific conductivity. This would lead one to believe that at least in that flowing stream segment (s), there is a direct influence from rainfall.

Various factors such as rainfall and illicit discharges were major factors in the Water Quality evaluation of the five City of Birmingham Watersheds. To demonstrate this, the City compared each Birmingham watersheds for particular parameters in the form of "Bar-Whisker" charts. The comparison was made for a six-year period. This is found in the **Results and Discussion** section of Water Quality. **Anti-degradation Analysis** is also depicted and reviewed in the Water Quality section for each watershed with the parameters selected from state law. Additional evaluations on the Village Creek watershed, such as the **Village Creek Loading Analysis** and the **Village Creek TMDL analysis** can be also found in the **Water Quality** section.

Heavy rainfall during the February 12, 2019 sampling event along Valley Creek resulted in high turbidity readings at VC02.9, VC0.7 and VC0.1s of 165 NTU's, 384 NTU's, and 177 NTU's respectively. On the same day

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along the Cahaba River at CR280 a NTU of 70.3 was observed. Again, heavy rainfall during the April 9, 2019 sampling event along Valley Creek resulted in high turbidity readings at VC02.9, VC0.7 and VC0.1s of 237 NTU's, 141 NTU's, and 157 NTU's respectively. These higher turbidity readings subsided as the rain event stopped, results reflected a continuous lowering of the Turbidity and TSS levels.



Also, lack of rainfall played an important role in water quality evaluation, as June 2019 had little rain fall and August 2019 was considered to be drought conditions for much of the Birmingham area. Two sampling events on July 13, 2019 and August 22, 2019, resulted in elevated E. coli levels of >2419.6 at SC5.5s which is a discharge point for commercial and residential areas of approximately 40 square miles. Under normal rainfall amounts and average temperatures, E. coli levels usually remain below the TMDL for Shades Creek. Historically this site has remained at acceptable levels since enforcement action was taken by ADEM with assistance from the

City of Birmingham resulted in the removal of Goo Goo Car Wash discharges to this sampling site. Monitoring will continue at this site to determine the location of additional discharges in the area. Also the increase of reported sanitary sewer overflows in this water shed for 2018-2019 as reported by Jefferson County Environmental Services could also be a major factor.

The pH of surface water generally ranged from 6 to 9.3 over the entire study period. USGS studies of ground water in the area indicate pH levels of 7.9 in the ground water at subsurface. ADEM established a pH range of 6 to 8.5 to reduce the effects of highly acidic or highly basic water on fish and wildlife. All pH levels in all Birmingham Creeks remained between 6.0 to 8.5, during the 2018-2019 fiscal year, except only once in Valley Creek where a pH of 9.3 was recorded during a heavy rainfall event. The timing of the sampling event during the beginning of a rainfall event could have influenced the pH reading, as the initial flushing effect of stormwater runoff entered the stream segment and contaminants raised the pH.

Village, Five Mile Creek and Cahaba River have either had improvement or no change in any the State's Anti-degradation level requirements when comparing historical data over the sampling period to the most recent sampling results for FY 2018-2019, However, Valley Creek showed high turbidity and E. coli levels similar to FY 2017-2018. This was the result of a continuing intermittent illicit discharge

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observed during two separate sampling events, December 11, 2018 and again on August 20, 2019. The event in December 2018 at VC0.1s yielded a turbidity reading of 84.7 NTU's and an E. coli reading of >2419.6 mpn/100ml. The event in August 2019 at VC0.1s yielded a turbidity of 99.0 NTU's and an E. coli reading of >2419.6 mpn/100ml. This continues to be investigated by Stormwater staff and it is suspected to be associated with a possible sanitary sewer leak in the general area of VC0.1s. Jefferson County Environmental Services has been notified and Stormwater's IDD&E staff is working to identify the source. Also, the more than double increase of reported sanitary sewer overflows in this water shed for 2018-2019 as reported by Jefferson County Environmental Services could be a major factor.

The dissolved oxygen and temperature levels did not fall below or exceed state anti-degradation policy at any time during the past six reporting cycles for any stream within Birmingham.

As reported by City of Birmingham Stormwater Management in the 2018 Annual Report to Alabama Department of Environmental Management, all reported zinc levels were not less than 5.0µg/L for the two previous reporting years as previously reported. After quality assuring the zinc lab data from EnviroLab with the Birmingham Water Works, it was determined that the zinc data previously reported to Stormwater Management was not correct. The data was reviewed and corrected and reported to

ADEM. Zinc data is only collected in Village Creek.

Overall, the intent of the City's water quality monitoring program was to broadly determine if a given stream was improving, remaining constant or becoming more polluted with respect to TSS over time and given the preponderance of established BMP controls. Compared with last year's data, the flow-weighted data for TSS was considered similar for the City and considerably lower for Industry. Furthermore, flow weighted TSS concentration for the City was much higher this year when compared with industrial discharges alone. This could possibly be attributed to periods of heavy rainfall during sampling periods.

MAJOR ACCOMPLISHMENTS

ADMINISTRATION

Effective October 15th, 2018, Joshua D. Yates, former Watershed Manager / Storm Drainage Engineer for the City of Tuscaloosa, replaced Tom Miller as the Stormwater Administrator. His knowledge and municipal experience in engineering, capital project management, lakes management, stormwater management, and floodplain management allowed for the City to merge related groups into a Watershed Management Division.

Direcus Cooper was promoted from Stormwater Specialist to Stormwater Program Manager during this permit year. Direcus has been with the City's Stormwater

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Division the longest, at 9 years. Direcus lead the efforts for the Water Quality Program and the Education and Outreach Programs. His current role will be to oversee the program more as a whole, and transition water quality and education and outreach efforts to other assigned staff.

Tracey Hayes was promoted to the Natural Hazards Administrator this year as well. She has worked for the Planning, Engineering, and Permitting Department for over 12 years in many different capacities. Her knowledge and background in zoning, permitting, planning, floodplain and legal will certain be as asset to the Division.

Troy Perry was promoted to Stormwater Specialist after 3 years with the City of Birmingham Watershed Management Section. His duties have expanded from not only water quality evaluation but to various other aspects of Watershed Management.

Sa'de McClaney was transferred from the Public Works Department from Planning Engineering and Permits. She is being trained to further develop the education component of the program.

Gloria Raspberry was promoted to Stormwater Specialist, her primary duty is to assist in the Post-Construction Stormwater Management in qualifying new and re-development program element.

Eddie Fowler was promoted to Principal Construction Engineering Inspector his primary duty is to assist in the Construction Site Stormwater Runoff Control program element.

The Stormwater Management Department was awarded a VISTA contractor for the year 2018 – 2019 permit year. Her name is Adyneshia Carter; she serves as an AmeriCorps VISTA for the City of Birmingham. She has helped create a quality control list for drainage issues, data



processing, and assisted with many other office and field projects. Ms. Carter is an Auburn University alumna. She received her Bachelors of Science in Chemistry. She has a strong

background in chemistry as well as research, customer service and sales.

AUDIT REPORT

During this reporting period Alabama Department of Environmental Management (ADEM), Stormwater Branch, conducted a 2-Day Audit (March 27-28, 2019) of the City of Birmingham's MS4 Phase I program for compliance with NPDES Permit ALS000032. ADEM found the program the highest possible score of "Satisfactory" on every component. Audit results are available upon request



Plans, Programs & Policies

The City of Birmingham continues to accomplish significant advances in planning, implementation of programs, and policy adaptation to improve our program efforts. Please note some of the efforts listed below:

The Woodfin Way

Since the start of the Woodfin Administration on Nov. 28, 2017, Mayor Randall L. Woodfin and his staff have dedicated ourselves to **"Putting People First"** across all of Birmingham's 99 neighborhoods and 23 communities. The implementation of our mission – **building community through servant leadership** – is a central focal point and motivating factor for all members of the Mayor's Office and City of Birmingham employees. The Mayor and his staff have developed a strategic plan.

The plan focuses on six goals:

- ★ **Safe, secure, and sustainable communities**
- ★ **Healthy, thriving and diverse neighborhoods.**
- ★ **High-performing "21st Century" education and workforce development systems.**
- ★ **Innovative and inclusive economy supported, shared, and served by all.**

- ★ **Highly effective, people first, smart government.**
- ★ **Global, legacy leadership partner for equity and social justice.**

For more on the Woodfin Way visit:
<https://www.birminghamal.gov/strategy>

Sustainability Program/Plan

The City of Birmingham Planning, Engineering, and Permits (P.E.P.) Department has been charged with developing a sustainability program/plan during this reporting period. Please see below some of the steps taken to achieve a more sustainable environment for our citizens:

ICLEI Local Governments for Sustainability: Through the City's membership with ICLEI, we have access to Clear Path, and plan to utilize to complete a greenhouse gas inventory. Local Governments for Sustainability is the leading global network of more than 1,500 cities, towns and regions committed to building a sustainable future. ICLEI also has created what is known as the Clear Path tool which is the leading online software platform for completing greenhouse gas inventories, forecasts, climate action plans, and monitoring at the community-wide or government-operations scales. This tool can help set a baseline for data for any forthcoming Sustainability Plan and efforts.

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UAB Sustainable Smart Cities: The City and UAB signed a Memorandum of Understanding, and the City continues to collaborate with the UAB Sustainable Smart Cities to educate staff and the public about concepts to improve sustainability within the City. City Staff and UAB Staff have developed a schedule to meet quarterly to collaborate on city-wide sustainability goals. Planning staff is hopeful with engaging subject matter experts and interns from UAB to facilitate the development of a GGI utilizing Clear Path.

Clean Industry Initiative: PEP Staff recognizes that any attempt to revitalize the community must be coupled with opportunities for sustainable growth by utilizing the innovations of green infrastructure, energy efficiency, resource conservation and environmental protection to create a cleaner and resilient community. One area of opportunity is industrial sustainability. The iron and steel industry sector helped to shape and grow Birmingham and was a significant economic driver for the region; however, the challenges associated with the industry's environmental impact was arguably even more significant. Although significant progress has been made to date, the City continues to face the challenge of remediating air, soil, and water quality issues that resulted from industrial manufacturing. In addition, because of national policy trends, the City anticipates a resurgence of industrial activity in the coming years due to rising demand for domestic iron and steel. However, to avoid

duplicating the mistakes of the past while capitalizing on the potential economic benefits of this resurgence, the City of Birmingham seeks to incentivize investment and the use of green and cleaner technologies by heavy industry that encourages green/sustainable buildings and operations. Promoting clean technology practices (the use of less material and/or energy, generates less waste, and causes less environmental damage than alternative technologies), will not only reduce the unintended adverse impacts on environmental quality and public health, but will also fully support the goals of the City's Sustainability Program. Sustainability was identified in the City's Comprehensive Plan as a key short-term goal to be attained within the next 10 years accomplished by providing a blueprint for residents, businesses, and governmental entities to implement sustainability strategies focused on the reduction of greenhouse gas emissions, the development of more energy efficient processes and the improved utilization of water resources.

The expectation is that these strategies will in turn promote the development of Cleaner Industry that will generate community revitalization and economic growth within Birmingham.

The City of Birmingham has partnered with Thriving Earth Exchange to develop more energy efficient processes in the iron and steel industry, as well as, other manufacturing within the City. Thriving Earth Exchange
(<https://thrivingearthexchange.org/>)

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helps volunteer scientists and community leaders working together to use science, especially Earth and space science, to tackle community issues and advance local priorities related to natural hazards, natural resources, and climate change. In 2019, Thriving Earth Exchange launched 100 partnerships, engage over 100 AGU members, catalyze 100 shareable solutions, and improve the lives of 10 million people. Through the Thriving Earth Exchange, local leaders and earth and space scientists will create resilient communities that enrich the earth. Working together, we will create solutions for the planet, one community at a time.

SOLSMART: The City of Birmingham is currently in the process of pursuing SolSmart designation. SolSmart (<https://www.solsmart.org/>) is led by the International City/County Management Association and The Solar Foundation, along with a team of partners with deep expertise in solar energy and local governments.

Local governments have tremendous influence over the prospects for solar energy growth. Unnecessary paperwork, red tape, and other burdensome requirements increase costs and discourage solar companies from moving to the area. By streamlining these requirements and taking other steps to encourage solar development, communities become “open for solar business.” Attracting solar investment is a great way to promote economic development and new jobs.

SolSmart uses objective criteria to designate communities that have successfully met these goals. These communities receive designations of SolSmart Gold, Silver, and Bronze. Since the program launched in 2016, more than 200 municipalities nationwide have achieved SolSmart designation.

To help communities achieve designation, SolSmart provides no-cost technical assistance from a team of national experts who work with local governments to evaluate programs and practices that impact solar markets, and identify high-prospect opportunities for improvement.

LEED for Cities and Communities (formerly the STAR Community Rating System): The City of Birmingham is currently a 3 STAR community under the STAR Community Rating System. In 2018, STAR Communities officially merged with the U.S. Green Building Council. The USGBC is launching a new rating system called LEED for Cities and Communities. The new program is data-driven and performance based, but will include those critical best practices needed to move the needle on local sustainability conditions.

The City of Birmingham is pursuing the LEED for Cities designation. This designation will allow the City of Birmingham to track and report progress towards meeting the City’s emissions targets and adopt LEED-based strategies that help to reduce energy, water, waste,

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pollution and CO² at the City scale, and in turn improve air and water quality.



City Comprehensive Plan:

The City has taken significant steps to capitalize on that effort in further significant planning refinements that will prove to be equally foundational in making Birmingham a more sustainable metropolis.

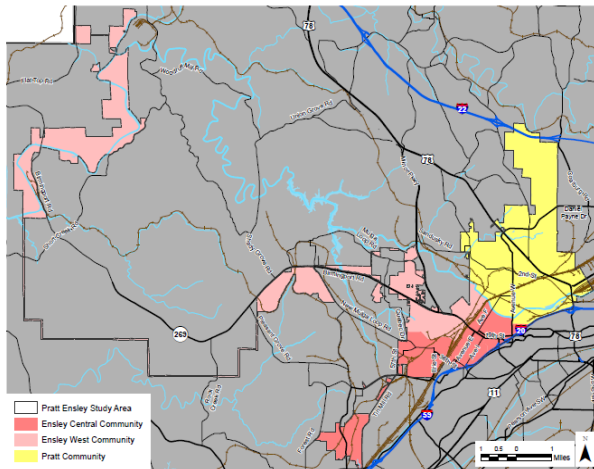
Four significant efforts continued in the development of city-wide planning controls. Those included continuation of Framework Plans, which are intended to encourage wiser patterns of real estate development and City growth while reducing the demand on existing infrastructure. Secondly, Planning Staff is continuing to develop a “sustainable plan” scope-of-work to assist in preparing development guidelines and standards that will assist the City in its efforts to become more sustainable. This latter effort also requires funding for implementation. The fact that funding has been elusive has contributed to project delay. Finally, the City has fully completed final development of the Village Creek Watershed Improvement Strategy and has begun similar development of a Valley Creek Flood Management and Water Quality Master Plan.

City Framework Plans:

The Framework Plans were established as a means to:

- ★ Identify areas of substandard housing and urban decline that would require city intervention;
- ★ Examine existing land uses and propose revisions that would align with the new Future Land Use Map from the Comprehensive Plan;
- ★ Register deficient quality of life issues (public safety, sanitation, recreation, commerce) that were identified by local stakeholders and provide possible solutions to bring about civic improvement; and
- ★ Create an implementation committee that would drive continued public involvement in making positive change within their communities.

Framework Plans have been annually reported and currently have progressed to the establishment of Implementation Committees that meet on a regular basis to discuss with City officials, local businesses and other stakeholders how they can best work together on the actions and strategies that have been developed within the existing framework plans.



Pratt/Ensley Communities Framework

Plan: The Pratt/Ensley Communities area (See Figure above) consists of intermittent creeks, which are tributaries to Village Creek and Locust Fork. These creeks often cause flash-flooding during heavy rains. The areas that are prone to inundation by 1% annual-chance flood hazard are referred to as 100-year flood zones and are so designated by the Federal Emergency Management Agency (FEMA). Lands susceptible to inundation by 0.2% annual-chance flood hazard are referred to as 500-year flood zones.

Residential areas along Village Creek, particularly in the Ensley and South Pratt neighborhoods, have been identified as areas containing clusters of hotspots with repetitive loss of properties. With funding support from the U.S. Army Corps of Engineers and the Federal Emergency Management Agency (FEMA), many flood prone properties were purchased and the flood plain area restored. However, not all

flood prone properties have been purchased and as a result have been abandoned, which has encouraged the area to be used as a dumping ground for debris and waste continuously creating a challenge to keep the floodplain clean and clear.

The results of Framework Planning for the Pratt/Ensley Area has established three goals, including:

- ★ Establish more recreational opportunities
- ★ Ensure natural water systems are valued and restored to improve habitat watershed health, especially near Village Creek
- ★ Establishment of a flood recovery and long-term resiliency plan

The following key stormwater related actions were recommended by community leaders:

- ★ Acquire blighted and flood-prone properties to expand recreational opportunities for residents
- ★ Continue working with the Village Creek Society to increase access to recreational facilities for residents
- ★ Provide incentives and education to homeowners for green design
- ★ Encourage the use of Best Management Practices (BMPs) on all new developments during post-construction to control soil erosion and minimize sediment run off.
- ★ Install green systems on blighted or vacant properties to reduce stormwater run-off and flooding in flood prone areas.



Eastern Communities Framework

Plan: The Eastern Area Framework Plan includes 19 neighborhoods, and more specifically includes the communities of Airport Hills, East Birmingham, East Lake and Woodlawn. The geographic area encompassed by this Framework Plan is 14.6 square miles and includes nearly 14,000 land parcels. The same three goals established for the Pratt/Ensley Framework Planning area were also identified for the Eastern Communities Framework Planning area. Currently, this plan is complete and being prepared for adoption.

The following key stormwater related actions were recommended by community leaders:

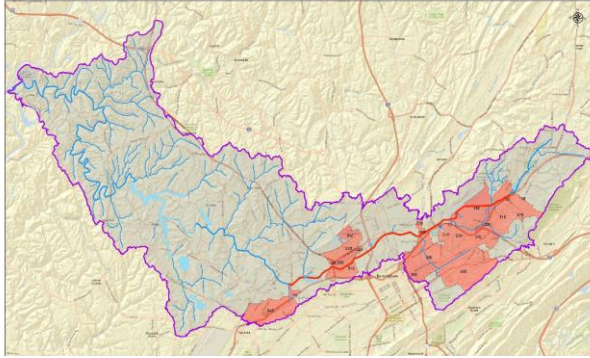
- ★ Install green systems on blighted or vacant properties to reduce stormwater run-off and flooding in flood prone areas
- ★ Develop a system of green systems
- ★ Consider the feasibility of using large blocks of vacant land in Airport Hills, Brummit Heights, and Zion City to plant pine trees to replenish the City of Birmingham's urban forest
- ★ Address issues at East Lake Park
- ★ Prioritize the construction of pocket parks and other green spaces in Woodlawn, Airport Highlands, Zion City, Brownsville Heights, Penfield Park, and Maple Grove

Many of the planning elements related to stormwater management recommended or proposed by these communities were included in and validated through the

watershed management planning effort by City staff for Village Creek. That includes also for the previously completed framework plans. Therefore, community action has been verified to provide a measure of improvement in flood protection and water quality improvement in Village Creek, reinforcing the community's recommendations and leading to the incorporation into the final frameworks plans, implementation.

Northside/Southside Communities Framework Plan:

This plan area consists of two communities and eight different neighborhoods. The first community to highlight within the Northside Southside Area is the Northside Community which consists of five neighborhoods (Norwood, Evergreen, Druid Hills, Fountain Heights, and Central City; while the second community is known as the Southside community which is made up of three neighborhoods (Southside, Five Points South, and Glen Iris. This Framework Plan area spans over 6.5 square miles and includes over 8,386 parcels.



Watershed Management Plans

Village Creek Watershed Improvement

Strategy: Building upon existing plans and framework plan development throughout the City in Village Creek, the City completed its first *Village Creek Watershed Improvement Strategy* in August 2017. Since then the City has reviewed and tried to determine a developmental approach to fund and strategize projects. The objectives of the strategy were to improve and protect water quality so that standards for designated uses would be attained, as well as to reduce flooding impacts within Village Creek through implementation of all strategy recommendations.

The report addressed the following controls to achieving attainment:

- ★ Development of a more robust asset management system
- ★ Development of an LID policy and ordinance
- ★ Continued maintenance dredging in accordance with ADEM requirements and turbidity BMP controls in place, in conjunction with sediment monitoring of zinc.

- ★ Continued implementation of trash controls and a more aggressive campaign to eliminate littering throughout the City.
- ★ Mitigation of Repetitive Losses
- ★ Encourage partnerships with other entities to reduce pollutant loading in key sub-basins
- ★ Consider modified riverine flood condition strategies like the reestablishment of bank full benches to better contain flood flows
- ★ Implement key capital improvement project controls to address flooding and water quality
- ★ Develop an Adaptive Management Plan to continuously evaluate the effectiveness of plans, policies, projects, and regulations to make necessary improvements and adjust capital and operating budgets accordingly.
- ★ Develop a SMART storm drainage maintenance program through collaboration with DWP and PEP, including the adjustment in street sweeping frequency.

Valley Creek Flood Mitigation Study: The City of Birmingham, City of Bessemer, and Jefferson County Commission are working with the United States Army Corps of Engineers (USACE) in a general information flood mitigation study of Valley Creek. The project extends from the daylighting of the creek near downtown Birmingham through Jefferson County, and Bessemer to Power Plant Road. Jefferson County represents unincorporated Jefferson County and several smaller towns along the creek.



Alternatives included in the analysis are: off-channel storage; bridge modifications; property buy-outs and relocation; levies; green spaces; and walking trails.

The purpose of the study is to identify flood mitigation alternatives; conduct hydrology and hydraulic (HH) analysis; and conduct a cost benefit analysis to determine flood mitigation alternatives that are financially viable. Consideration of recreation and water quality benefits are also included in the benefit analysis.

The City of Birmingham developed a one-dimensional HEC-RAS model based on the Lidar topographic, ground surveys of the bridge structures, and ground cross section to supplement the Lidar in the channel. The model was further developed by the USACE to a two-dimensional model for evaluation of the flood mitigation effects of the alternatives. A cost benefit analysis is underway to tentatively select a plan.

The study began in 2018 and is scheduled for completion in late 2020. The HH modeling has been completed and alternatives with significant flood mitigation impact has been completed. The non-structural alternatives and cost benefit analysis are underway. A public forum is scheduled for April of 2020 to inform the public of the alternatives under consideration.



Shades Creek Watershed Management

Planning: During this reporting period City of Birmingham Stormwater Management Division members joined the Steering and Technical Committee along with other municipalities, to develop a Shades Creek Watershed Management Plan. The purpose of the Shades Creek Watershed Management Plan (WMP) is to guide watershed resource managers, policy makers, community organizations, and citizens to protect the shoreline, water quality and habitat supporting healthy populations of people, wildlife, and fish, and providing recreation and economic opportunities for the greater Birmingham area. The vision of the Shades Creek is a healthy watershed environment by fostering the coordinated effort to protect, restore, and enhance the overall quality of life by preserving and restoring water quality, natural habitats, biological resources, and recreational resources. A watershed is defined as the land area draining to a particular body of water. The project area is made up of the following three watersheds- Upper Shades Creek,



Lower Shades Creek and Cooley Creek/ Mud Creek. Birmingham has jurisdiction over a critical part of the stream between Irondale and Mountain Brook.

Floodplain Management

Floodplain Management continues to be a City strength with numerous ongoing projects during this reporting year, as follows:

Village Creek FEMA Assessment Study- Roebuck to Pleasant Hill Road - Collegeville Neighborhood Benefits (Locust Fork Risk Map Effort: The City received D-FIRM data for the Locust Fork Watershed Risk Map which became effective March 2019. As a result of this restudy and remapping effort, a total of 454 structures were removed from the Special Flood Hazard Area of the Locust Fork Watershed which includes all of Village Creek, a very small portion of Valley and all of Five Mile Creek within the City's Corporate Limits. With this reduction of properties in the floodplain, property owners will potentially be able to benefit from eliminated or reduced cost in flood insurance premiums and will potentially be able to complete renovation or construction projects without the additional time and costs associated with developing in a floodplain.

FEMA's Community Rating System (Class 5 Designation): The City is a Community's Rating System's Class 5 Community. The City is the only Class 5 Community in the State of Alabama; ranks in the top 8% of CRS Communities in Region 4; and ranks in the top 19% of CRS Communities in the nation.

Being the highest-rated Community in Alabama, our flood policyholders will now see a total savings of \$15,000 per property over a 30-year mortgage regardless of their individual risk. The City has been a participant in this program since 1993. This program rewards communities for going above and beyond the National Flood Insurance Program's minimum standards. These rewards are provided in the form of 25% flood insurance premium discounts. Education and outreach play a large role in contributing to the City's success with the program.

Village Creek Stream Monitoring System Assessment & Flood Forecast Implementation System: The Stream Monitoring System Assessment and Flood Forecast Implementation System for the Village Creek Project is currently underway as part of the Silver Jackets Pilot Project in cooperation with the State Office of Water Resources, US Army Corps of Engineers, USGS, and the National Weather Service. "Silver Jackets teams in states across the United States bring together multiple state, federal and sometimes tribal and local agencies to learn from one another in reducing flood risk and other natural disasters." Through the team effort, the City of Birmingham is currently in the process of evaluating its existing stream monitoring system along Village Creek throughout Jefferson County and implementing a Flood Forecast System for Village Creek. This assessment will aid in the development and evaluation of the City's water quality



monitoring needs and in the development of a plan for the repair, rehabilitation, and addition of new equipment to make the system fully operational and beneficial to the communities it serves along Village Creek. The funding appropriated for this project is \$33,500 and the benefits of protecting life and property by preparing residents for a flood far outweigh the costs.

Post Disaster Recovery Plan: The Post Disaster Recovery Plan will fulfill the City of Birmingham's commitment to effectively and efficiently implement recovery programs while maximizing Federal financial participation. It will incorporate the National Disaster Response Framework (NDRF) as the City standard for emergency recovery operations and establish the overall roles and responsibilities for emergency recovery operations, as well as the concept of operation for the City. The Plan is intended to be used in conjunction with established operation procedures, plans, protocols and planning processes that will allow the City to implement a more efficient recovery program. The funding obligation for this project is \$95,000; however, our Post Disaster Recovery Plan gives us an opportunity to achieve a more sustainable and resilient community after a disaster, a benefit that can save millions of dollars in long term recovery efforts.

Valley Creek Inundation Mapping: The Inundation Mapping efforts for the Valley Creek Project is currently underway as part of the Silver Jackets Pilot Project in cooperation with the State Office of Water Resources, US Army Corps of Engineers,

USGS, and the National Weather Service. Through this team effort, the City of Birmingham will use existing flood warning system to construct a rainfall-runoff forecasting model. The model developed through this effort will be used to generate inundation mapping to provide a visual aid for making flood emergency response decisions during flood events. The funding appropriated for this project is \$100,000 and the benefits of protecting life and property by preparing residents for a flood far outweigh the costs. The flood inundation mapping should be available to the public early 2020.

Program for Public Information: Under the CRS, a Program for Public Information (PPI) was created to continuously inform Birmingham residents about flooding and ways to address potential flood damage to their property. This plan included map information, tailored outreach projects including website changes and information distribution practices the City utilizes for floodplain properties. The ultimate goal is to continue to educate and promote community resilience which is necessary to minimize flood damage. We understand that well-informed people make better decisions and will take steps to protect themselves and their property and are more likely to support local floodplain management efforts to protect the natural functions of the floodplain. This PPI helped increase our community class rating in the CRS, yielding greater saving to flood insurance policyholders.



Repetitive Loss Area Analysis (RLAA):

Late 2016, City Council adopted the Repetitive Loss Area Analysis. The City performed a detailed analysis centered on the repetitive loss properties that were identified by the Insurance Service Office. The process included analyzing repetitive loss properties, topographic features, existing drainage projects, and other efforts across the City near repetitive loss structures to determine the root cause of flooding for these properties. This analysis resulted in the City designating a total of 32 repetitive loss areas. The identification and designation of repetitive loss areas will provide the source of flooding and possible techniques to reduce future flood damage on an area-wide basis. The City continues to analyze and update the analysis in an effort to address the potential hazards these areas face.

using a \$3,000 mini-grant from the Cities of Service Love Your Block (LYB) Program to promote nutritional awareness and transform vacant properties into functional uses in the Ensley community. The community garden is located on two vacant lots along 19th Street Ensley. The community garden is comprised of several raised beds along with eleven (11) fruit trees. An interesting note about the community garden is that it is located within a floodplain. The community garden serves not only as a growing area but as an ecological infrastructure for flood control. Excess stormwater runoff is used as an irrigation system to cultivate vegetables and fruit for the garden. In addition, reduce the amount of pollutants seeping from the impervious surface of the local streets. Future plans are to expand the site and continue building the area as an asset for stormwater retention.



Holy Family-Tuxedo Junction Community Garden: The Holy Family-Tuxedo Junction Community Garden was started in May 2018



STORMWATER PROGRAM ELEMENTS

STRUCTURAL CONTROLS

The City of Birmingham maintains 15 facilities with wet ponds. These ponds are depicted on maps, which can be found in the structural control section of this report. These ponds were constructed primarily for flood control and are not designed to achieve maximum pollutant removal efficiencies. However, the ponds are expected to provide pollutant reduction to an extent based on unit process and operational principles. Load reduction estimates presented herein are based on the assumption that the City owned wet ponds resemble the design appropriate for stormwater quality control and how each would be expected to respond to the environmental conditions present during each reporting year. New inspection sheets were developed and all known City of Birmingham Structural Controls for 2018 – 2019 were inspected semi-annually by Stormwater Management personnel. No reported maintenance except for removal and treatment of woody vegetation at the



Greenwood Park site and sediment removal at the Birmingham Botanical Park Japanese Garden Sunset Lake were documented. Additional record keeping on maintenance and sediment removal will be implemented by Parks and Recreation and DPW after personnel training is complete.

STRUCTURAL CONTROL SUMMARY

Wet ponds are developed to serve two functions in Birmingham, flood control and pollutant removal thereby bringing both stormwater quantity and quality benefits. These ponds fill with stormwater and release most of it over a period of a few days, slowly returning to its normal depth of water. Some stormwater infiltrates into underlying soils. Some is evaporated back into the atmosphere. These latter processes mark a reduction in stormwater quantity to the City's MS4. Wet ponds provide stormwater quality benefits through several mechanisms, including:

- ★ Gravitational settling of suspended particulates
- ★ Biological uptake of pollutants by plants, algae, and bacteria
- ★ Pollutant decomposition

When pollutants enter the pond during a rain event, the pond slows the water movement, allowing heavier pollutants such as suspended solids, sediments, and metals

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to settle out of the water column and come to rest at the bottom of the pond. This greatly improves overall turbidity, or water clarity. Many of the nutrients are also removed from the water by plant growth. Bacteria can also be depleted within the ponds biological processes. The City of Birmingham maintains 15 facilities with wet ponds like the one shown in the figure to the left of Railroad Park that it owns on a semi-annual basis or as necessary. These ponds are depicted on maps, which may be found in Appendix A. These ponds were constructed primarily for flood control and are not designed to achieve maximum pollutant removal efficiencies. However, the ponds are expected to provide pollutant reduction to an extent based on unit process and operational principles mentioned earlier. Load reduction estimates presented herein are based on the assumption that the City owned wet ponds resemble the design appropriate for stormwater quality control and how each would be expected to respond to the environmental conditions present during each reporting year. The Structural Controls will be inspected semi-annually by Stormwater Management personnel. The wet ponds owned and maintained by the City of Birmingham includes:

1801 14th Street, SW (Lat. 33.47795N, Long. -86.84743W): This facility is located in the Southwest portion of Birmingham adjacent to a residential area behind a church with a large impermeable parking lot. This was designed as a detention pond but has become a retention area due to accumulation of organic matter over a



period of time. Birmingham Public Work Department is responsible for the maintenance of this site. The structure accepts drainage from approximately 0.005 square miles and discharges into an old abandoned commercial site that has become a wetland. The wetland discharges through a culvert into Valley Creek.

Avondale Springs (Lat. 33.43352N, Long. -86.77222W): This facility is located at 5th Avenue South and 41st Street. The City of Birmingham Park and Recreation is tasked with the maintenance responsibilities at this location. The lake is approximately 1.5 acres and is stocked with fish and provides an environment for water fowl and various aquatic species. Avondale Lake is fed by a natural spring and has been sampled for water quality. The overflow of Avondale

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Lake feeds into Cotton Mill Branch a tributary to Village Creek.



Birmingham Botanical Gardens (Lat. 33.48661N, Long. -86.77519W): This facility is located at 2612 Lane Park Road in Birmingham and has multiple small retention ponds incorporated into the landscape as small water features. Botanical Garden staff maintains these water features and is responsible for upkeep and repairs. The Water features drains approximately 0.3 square miles' upland from the Gardens. The majority of the drainage basin is considered residential and open space. The drainage in this area drains through a



system of culverts and open ditches to Shades Creek.

Birmingham Zoo (Lat. 33.48492N, Long. -86.78181W): This facility is located at 2630 Cahaba Road, Birmingham and has numerous small water features along with open space and permeable areas for rain water absorption. The property drains to a large retention pond south of the Zoo and collects surface drainage from surrounding neighborhoods as well. The retention pond, during heavy rainfall events, discharges into Shades Creek. Animal waste is collected in a separate area and is not allowed to discharge into the watershed. The facility is maintained by Zoo personnel and Public Works.

Tom Bradford Park (Lat. 33.66180N, Long. -86.65486W): This facility is located at 1701 Edwards Lake Road, Birmingham. The park has a large retention pond, approximately 1.0 acre, at the south end of the park that accepts surface drainage from the open area of the park and the surrounding forested area that is approximately 0.001 square



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miles. The City of Birmingham Park and Recreation staff is responsible for maintenance on the park structures. The retention pond discharges through a gated spillway into a tributary that feeds the Cahaba River.

CrossPlex (Lat.33.49647N, Long.-86.86900W): This facility is located at 2331 Bessemer Road, Birmingham. This area has a large retention pond that was under construction during the time of inspection on July 27, 2017 and April 10, 2018. This new retention pond replaces an older retention structure and discharges into Valley Creek. Large amounts of concrete surface area have been removed from this facility in order to promote pervious areas for rain water to infiltrate.



Approximately 0.43 square miles of residential, commercial and open area will drain to this retention pond. Birmingham Park and Recreation staff is responsible for maintaining this structure once the contractor is completed and all contractual obligations have been met. Follow up

inspection will be conducted by Stormwater Management staff.



Eastern Area Landfill (Lat. 33.59426N, Long. -86.63446W): This facility has four separate retention ponds located south and south-west of the landfill and one detention pond on the northern section of the landfill that drains to a fifth large retention pond. The drainage from the landfill moves in two different directions, with the retention ponds to the south and west draining into the Stinking Creek water shed. The remaining northern most retention and detention area releases water into the Pinchgut Creek watershed.



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The western most retention pond is equipped with a sand filter system that is replaced when necessary (approximately every 5 years). Maintenance at this facility is the responsibility of City of Birmingham Public Works Department. This facility drains approximately 3.9 square miles total of open area consisting of reclaimed landfill. The two aforementioned watersheds were combined for calculation purposes. Stormwater Management staff conducted inspections on all structures on a semi-annual basis. For the purpose of calculation and areas of retention were combined into two smaller drainage basins and area were calculated on that basis.



Eastlake Park (Lat 33.57050N, Long. - 86.72592W): This facility is a 27-acre retention lake created by damming part of the tributary to Village Creek at Roebuck Springs. Eastlake Park is located at 4th Avenue North and 82nd Street North, Birmingham. Eastlake Park is maintained by Birmingham Park and Recreation and is home to numerous aquatic species along

with an island that is a protected nesting site water fowl. The water collected in the pond discharges directly into Village Creek. This facility accepts drainage from an area dominated by residential, commercial and open space approximately 6.0 square miles in area.

Greenwood Park (Lat. 33.55037N, Long.- 86.78373W): The facility was designed to control local area flooding and along Village Creek directly west-southwest of the Birmingham International Airport at 1632 Tallapoosa Street, Birmingham. The area consists of a large detention/retention area with gates that will automatically lift or close based on the water level flowing into the structure. When the water level reaches a high level, pumps are used to pump the excess water into pre-detention which then flows into three separate bio-swale structures that discharge into Village Creek (please see operational information in Appendix-A). Birmingham Park and Recreation staff is responsible for maintenance of the structural controls.

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Highland Golf Facility (Lat. 33.51141N, Long. -86.77778W): This facility has a retention pond associated as a water feature (water hazard) approaching the green on the 10th hole of Highland Golf Course at 3300 Highland Avenue, Birmingham. The Lake is approximately 3 acres in size and accepts drainage from approximately 0.3 square



miles from the golf course and surrounding residential neighborhoods. The pond discharges into the City of Birmingham's MS4 and finds its way to Village Creek. Highland Golf Course is maintained by City of Birmingham Park and Recreation staff and Troon Golf a golf management company.

New Georgia Landfill (Lat. 33.59399N, Long. -86.81027W): This facility is the primary solid waste disposal site for the City of Birmingham and is located at 47th Avenue and Lewisburg Road, directly north of Birmingham. The facility uses a 0.5-acre retention pond to control drainage from the landfill on the north end of the facility. The retention pond then discharges into a smaller approximately 0.1-acre retention

pond before entering Five Mile Creek. Heavy siltation in the first retention area occurs because of the lack of vegetation due to active landfill operations. The silt is continually removed from the retention pond to increase capacity and the material is hauled away for approved disposal. The retention pond accepts approximately 0.1 square miles of runoff from the landfill. City of Birmingham Public Works staff is responsible for Maintenance and siltation removal.

Oxmoor Community Center (Lat. 33.42220N, Long. -86.85373W): This facility is located at 1992 Wenonah Oxmoor Road, Birmingham. The Community Center sits on a hill above a large retention pond that accepts water from surrounding commercial properties and forested areas with some open space. The drainage sub-basin has an area of approximately 0.1 miles and the lake outfalls towards Shades Creek. The lake is approximately 1.0 acre and is maintained by City of Birmingham Public Works staff.

Patton Park Lake (Lat. 33.54505N, Long. -86.78214W): This facility is located at 3969 14th Avenue North, Birmingham. A large 7.1-acre retention lake is used to maintain water quality at this location. The lake discharges into the City of Birmingham MS4 close to Village Creek and accepts storm runoff from surrounding areas including residential, commercial, industrial and open space. The facility is maintained by Birmingham Park and Recreation staff.

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Railroad Park (Lat. 33.51017N, Long. - 86.80895): This facility is located at 1700 1st Avenue South, Birmingham. Railroad Park is a 19-acre park with several water features scatter across the area flowing to the west at 14th street was a pump system recirculates the water back to the east of the park. Irrigation is also used to maintain plants through dry periods. The water features discharge into the City of Birmingham's MS4 at the 14th street point and continues to Valley Creek. The facility is maintained by Birmingham Park and Recreation staff along

with Railroad Park organization that manages events at this location.

Roebuck Springs (Lat. 33.58378 N, Long. - 86.71044 W): This location is perhaps most notably known as the location where the endangered Darter species are located in the City limits. This facility is located at 8920 Roebuck Boulevard, Birmingham, and is next to the parking area for the Roebuck Recreation Center and Don Hawkins Golf Course. This location is part of the headwaters for Village Creek and is spring feed into a retention area approximately 1.0 acre in area. City of Birmingham Park and Recreation staff maintain the area. The surface drainage in this area is .037 square miles comes from commercial, institutional, residential and open space surrounding land use categories.

The City of Birmingham maintains all Structural Controls and has no maintenance agreements with outside or private contractor.

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Semi-Annual Inspection Schedule for 2018-2019

FACILITY	INSPECTION DATES		ADDITIONAL (IF NECESSARY)
Avondale Park	11/19/2018	6/5/2019	
Birmingham Botanical Gardens	3/7/2019	7/30/2019	
Birmingham Zoo	3/7/2019	7/30/2019	
Bradford Park	1/15/2019	6/3/2019	
CrossPlex/Fair Park	1/24/2019	7/19/2019	
Eastern Area Land Fill	2/7/2019	7/25/2019	
East Lake Park	1/15/2019	6/27/2019	
Greenwood Park	2/15/2019	7/16/2019	
Highland/Boswell Golf Course	2/13/2019	7/24/2019	
New Georgia Landfill	2/25/2019	7/24/2019	
Oxmoor Community Center	2/28/2019	6/27/2019	
Patton Park Lake	2/15/2019	7/16/2019	
Railroad Park	11/5/2018	6/19/2019	
Roebuck Springs/Hawkins	1/15/2019	6/3/2019	
1801 14TH ST. S.W.	1/24/2019	6/24.2019	



30 inspections were conducted on City Controlled Structural Controls for 2018-2019 period for permit ALS000032.

Additional Inspections may be warranted as necessary

MAJOR FINDINGS:

Overall impact of structural controls predominately using wet ponds for water quality purposes, that are on properties controlled or owned by the City of Birmingham, have had a positive effect to reduce the overall annual levels of total suspended solids by approximately 191 tons, total Nitrogen by 1.2 tons and total phosphorus by 0.2 tons. No sediment or floatable material removal was recorded by Public Works or Parks and Recreation during the 2018 – 2019 fiscal year, with the exception of The Birmingham Botanical Gardens and Greenwood Park. DPW is working to record maintenance activities on a spread sheet with the location and type of work done. No significant maintenance activities were recorded for other structural controls for this reporting period.

MAJOR ACCOMPLISHMENTS:

The City of Birmingham Botanical Gardens: During Fiscal year 2019 the Botanical gardens conducted sediment removal in the Sunset Pond located in the Japanese Garden section of the gardens. This was done after 5 years of sediment accumulation. The removal process was

done with the use of porous filter bags used to capture the sediment after a vacuum removed the sediment from the bottom of the pond and allowed the water to flow out of the bags retaining the sediment. The sediment was transported to the local landfill for proper disposal. The dimensions on the sediment bags were used to calculate total cubic yards to determine the tons of material removed. 198 tons of sediment was removed from the Sunset Pond after the 5-year accumulation.

Smaller structural control components were cleaned as part of the annual maintenance conducted by Botanical Garden staff. The smaller structural controls are drained and manual and equipment removal of sediment was conducted yielding approximately 7.5 tons' from Sonat Lake at the main entrance of the Gardens and 3 tons collected out of the Japanese stream setting structure. The total estimated amount of sediment removed from all Botanical Garden Structural Controls for Fiscal Year 2019 was 208.5 tons of material.

Greenwood Park: Follow up inspections on February 15, 2019 and July 16, 2019, as a part of the City's routine, biannual structural controls inspection program was conducted to try and resolve structural components issues. This park maintains a sophisticated complex of structural and non-structural flood control and water quality components before discharging directly into Village Creek. The structural flood control



component includes diversion weirs and electric pumps to divert water to adjacent bioswales before discharging directly into Village Creek. At the time of inspection however, the structural flood control components (i.e. weirs, pumps, electrical component main board, etc.) was not functioning at all. Attempts to locate repair parts, so that the components may be repaired has led to incomplete repairs. Research by Park and Recreation has indicated that the company that was responsible for maintaining repair components has gone out of business. To this date Parks and Recreation have not been able to locate the parts needed to properly operate the control components. Parks and Recreation will continue to address facility maintenance requirements with resources available. All bioswales have been cleared of all noxious, non-native plant species and all woody plant materials have been removed and the stumps treated to prevent regrowth. All sedimentation will also be removed and properly disposed of in a City landfill. A copy of the maintenance and operations manual for the gate and pumps for the structural Control is available upon request.

Woody vegetation at Greenwood Park was treated during July 2019 with herbicide application to prevent growth of unwanted growth. Area was dry and no contamination from treatment affected aquatic areas.

Certified personnel were on-site to comply with training requirements.

Eastern Area and New Georgia Landfill: Future plans are being implemented at both Eastern Area Landfill and New Georgia landfill in order to upgrade Structural Controls. ADEM is aware of these plans and Volkert Engineering is assisting the City of Birmingham Public Works to reach current compliance standards. Work is planned during FY 2020 to meet ADEM compliance requirements.

Providing semi-annual inspections on all structural controls at City of Birmingham facilities has allowed for another layer of oversight at facilities that are sometimes the responsibilities of more than one City Department. This oversight helps to foster communication between Departments and allows the City to coordinate and utilize resources to better maintain these control structures. Inspections allow the City of Birmingham to better meet Permit conditions related to the MS4 and Stormwater Management. The City of Birmingham has included requirements during the permitting process to recognize and identify structural controls on all privately-owned properties. This tracking will help identify locations of such controls, so a follow-up inspection program may be implemented if necessary in the future.



PROGRAM STRENGTHS/WEAKNESSES:

Providing semi-annual inspections on all structural controls at City of Birmingham facilities have allowed for another layer of oversight at facilities that are sometimes the responsibilities of more than one City Department. This oversight helps to foster communication between Departments and allows the City to coordinate and utilize resources to better maintain these control structures. Inspections allow the City of Birmingham to better meet Permit conditions related to the MS4 and Stormwater Management.

The strengths of providing these annual inspections allows the City of Birmingham to estimate the reduction of pollutant loads by using properly designed Structural Controls. The pollutant load reduction in the overall watersheds may not be as significant as the overall pollutant load, but it does help to see the need for more structural controls to reduce the pollutant load on the various Creeks and Rivers in the City of Birmingham's watersheds. Additional Structural Controls whenever possible should be utilized more frequently. The amount of actual sediment and floatables removed from City owned structural controls was not routinely tracked by all City Personnel to determine the actual effectiveness of structural controls. Only Birmingham Botanical Gardens and Greenwood Park provided a record of maintenance activities for FY 2018-2019.

Other Structural Controls did not indicate or record any work or sediment and trash removal for FY 2018-2019.

FUTURE DIRECTION:

A significant amount of pollutant load from respective drainage basins was estimated to be reduced by the City owned wet ponds, assuming the ponds resemble a wet pond design. Literature has published a wide range of performance levels for pollutants controlled by wet ponds; literature published median performance levels were employed in estimating pollutant load reduction by City owned wet ponds. It may be expected that a well-designed or retrofitted wet pond for water quality protection will further reduce pollutant loads beyond the reductions estimated and presented in this Section of the SWMPP, meeting even higher performance levels than otherwise found in published literature. For more discussion on this subject the reader is invited to see "***Post Development Water Quality Treatment Controls***" in the SWMPP. The amount of actual sediment and floatables removed from City owned structural controls will be tracked to determine the actual effectiveness of structural controls and a record of maintenance for structural control activities will be maintained to help (DPW) Department of Public Works and Parks and Recreation in scheduling regular maintenance.

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The City of Birmingham has included requirements during the permitting process to recognize and identify structural controls on all privately-owned properties. This tracking will help identify locations of such controls, so a follow-up inspection program may be implemented if necessary, in the future.

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Description of BMP	ACTIVITY SCHEDULE				COMMENTS
	Measurable Goal	Complied With	Activities Accomplished		
			2018	2019	
Storm Drain Inlets Cleaned (#)	1,500 annually	Yes	6260	1715	
Storm Sewer Lines Cleaned (Lin Ft)	90,000 annually	Yes	554,684	157,906	
Litter Cleared (Blocks)	30,000 annually	Yes	483,267	406,767	
Pipe Repaired / Replaced (Lin Ft)	500 annually	Yes	432 ft.	814	
Inlet Constructed (#)	100 annually	Yes	47	210	
Curb & Gutter Const. (Lin Ft)	900 annually	Yes	640ft.	5256ft.	
Storm Sewer Tops Made (#)	350 annually	Yes	937	394	
Storm Sewer Tops Set (#)	4, 000 annually	Yes	6260	2698	
Inventory of Storm Sewer System	Completed Sept 2015	Yes	806 outfalls total. No new outfalls have been discovered	806 outfalls total. No new outfalls have been discovered	
Streets Swept (curb miles)	2500 miles annually	Yes	165,817	2988	

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Structural Control Inspection Checklist

Retention/Detention Basin Inspection Form		
Site:	Inspector:	
Basin I.D.:	Responsible Party:	
	Date:	
	Date Delivered:	
CRITERIA	SAT/UNSAT/NA	COMMENTS
1. FOREBAY: >50% filled with sediment = UNSAT and note ATTN REQUIRED		
2. INLETS: Note signs of erosion and/or low spots		
3. OUTLET: Note signs of erosion and/or low spots		
4. PRINCIPAL SPILLWAY: Note signs of erosion, obstructions, seeping.		
5. EMERGENCY SPILLWAY: Note signs of erosion, obstruction.		
6. BASIN BOTTOM AND SIDE SLOPES: Note erosion, ground cover woody vegetation.		
7. SAFETY DEVICES: Fences, gates, locks, etc.		
8. EMBANKMENTS: Note adequate ground cover, signs of erosion, woody vegetation, low spots, cracking, animal burrows, signs of instability.		
9. STRUCTURAL COMPONENTS: Note signs of settling, cracking, bulging, misalignment, or deterioration.		
10. ROUTINE MAINTENANCE: Does facility require mowing, trash pickup?		
11. CONDITION OF AQUATIC ENVIRONMENT: Note excessive algae, dominance of one vegetative type, evidence of non-storm water discharges of fish kill.		
12. VEGETATION: Is vegetation healthy and providing appropriate cover? Note presence of unwanted vegetation.		
13. STORAGE VOLUME: Note evidence of conditions that significantly reduce storage volume.		
14. DEBRIS / SEDIMENT ACCUMULATION: Note evidence of trash, floating/floatable debris, or sediment accumulation not otherwise noted. Note location.		
15. STANDING WATER: Is there standing water in appropriate areas? Inappropriate areas?		

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Stormwater Management

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16. SAFETY AND AQUATIC BENCH		
17. SIDE SLOPE VEGETATION		
18. OTHER		

PHOTOGRAPHIC LOG

Project:
City of Birmingham MS4 Program
Structural Controls Inspections:

Location:
Creek

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ADDITIONAL NOTES

(If needed attach additional pages to properly document the inspection.)

RE-INSPECTION REQUIRED	YES	NO
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Signature and Date of Person Completing the Inspection

All repairs to be completed within 30 days of notification.

Responsible Party:	NAME:	DATE:
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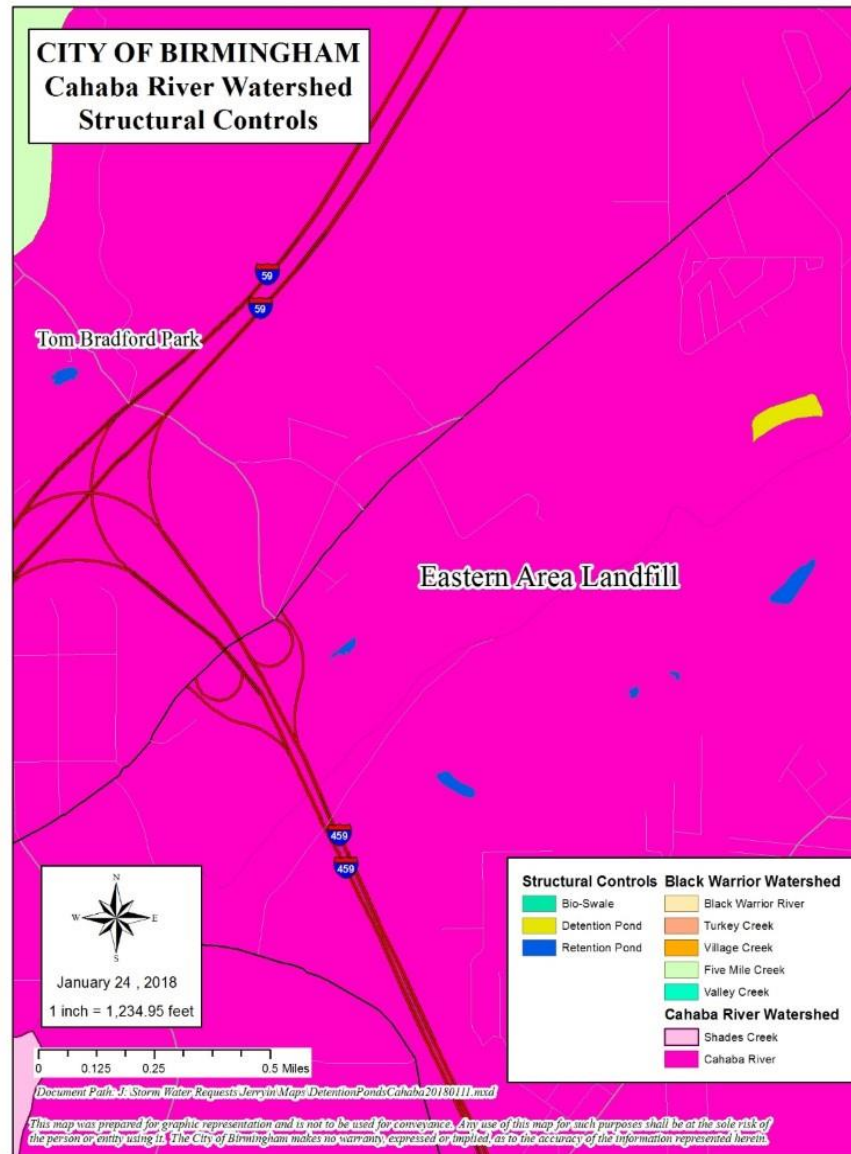
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Stormwater Management

Last Modified: 3/1/2018



Maps of Structural Controls by Drainage Basins

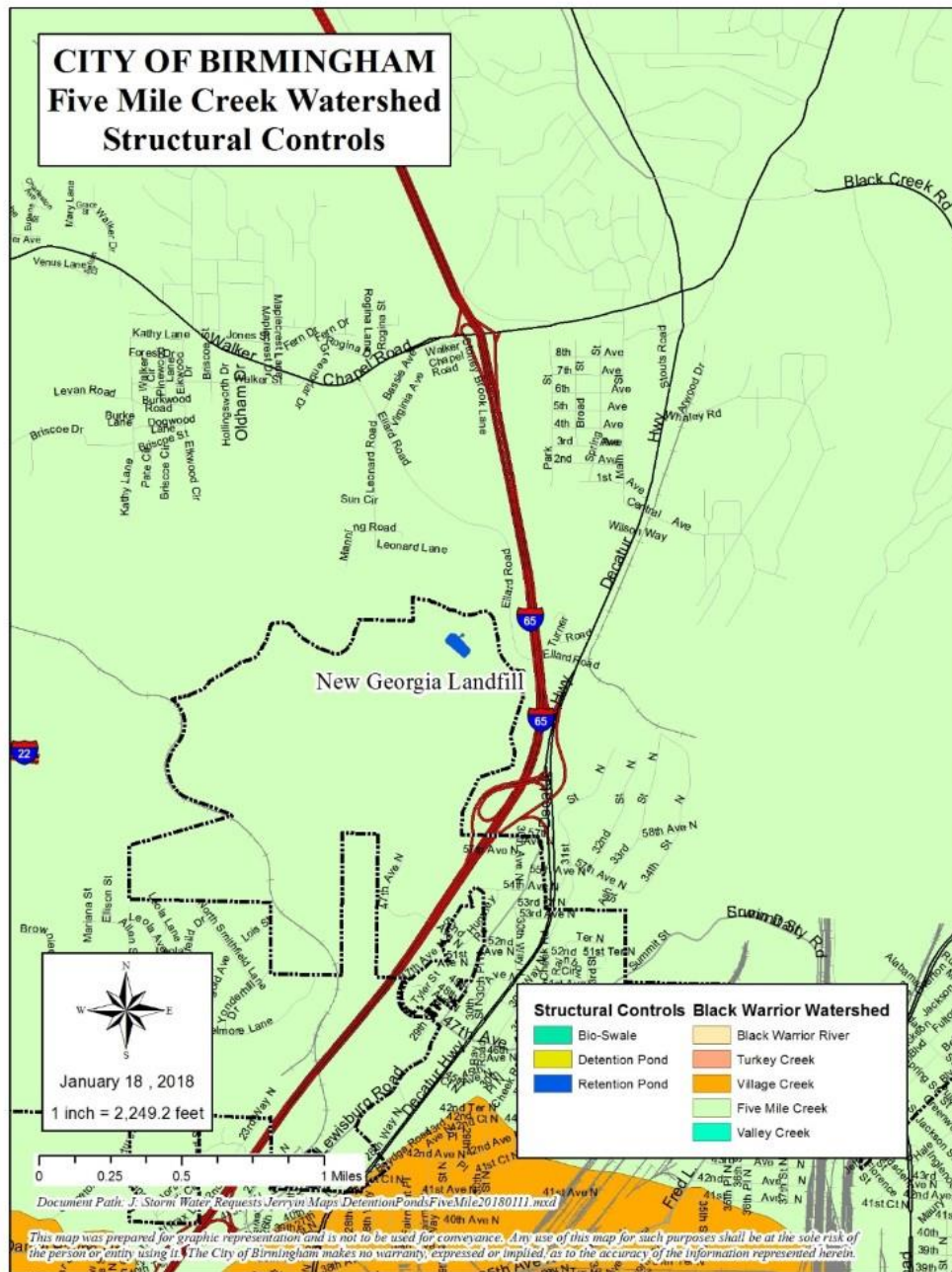


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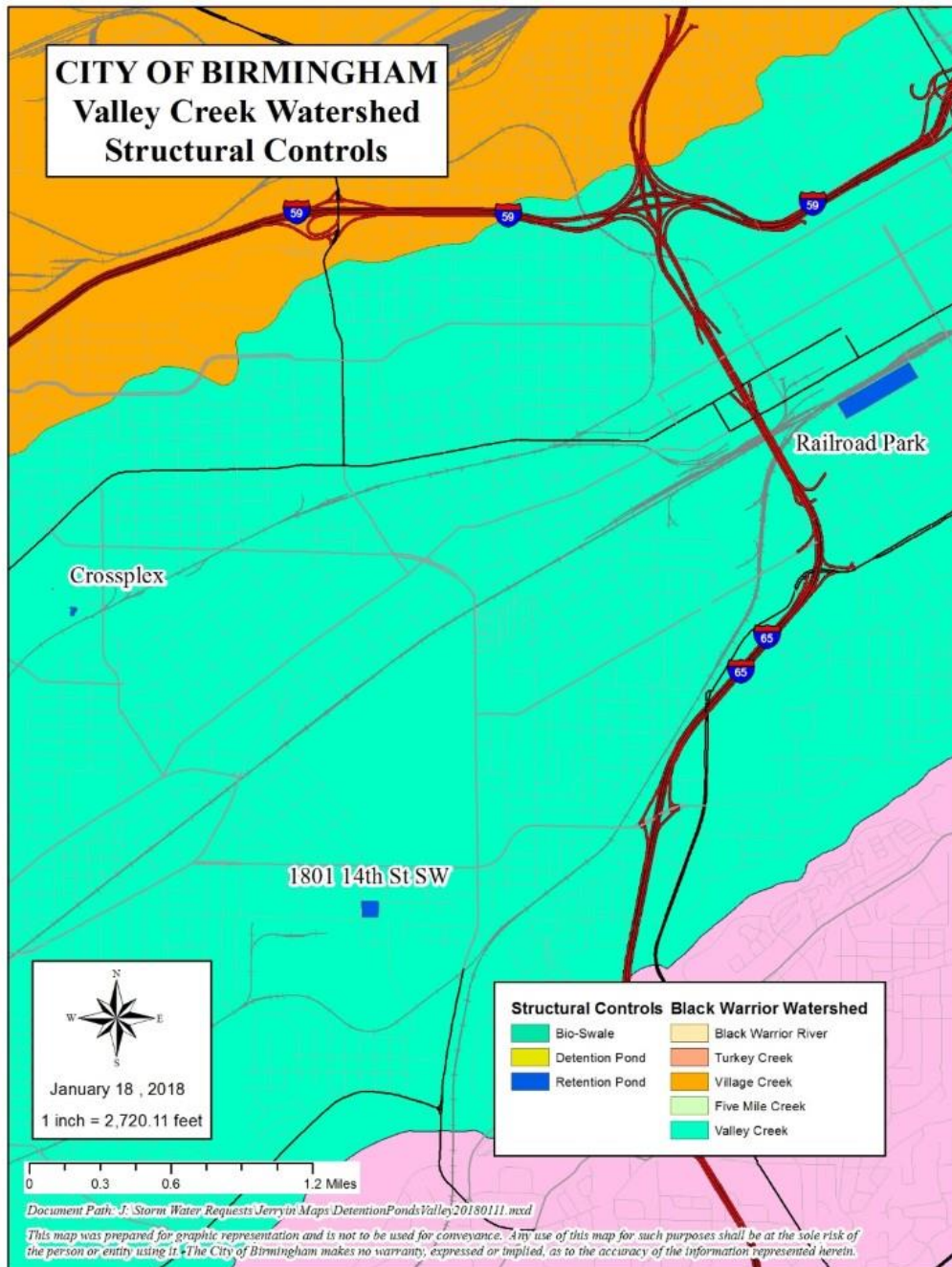
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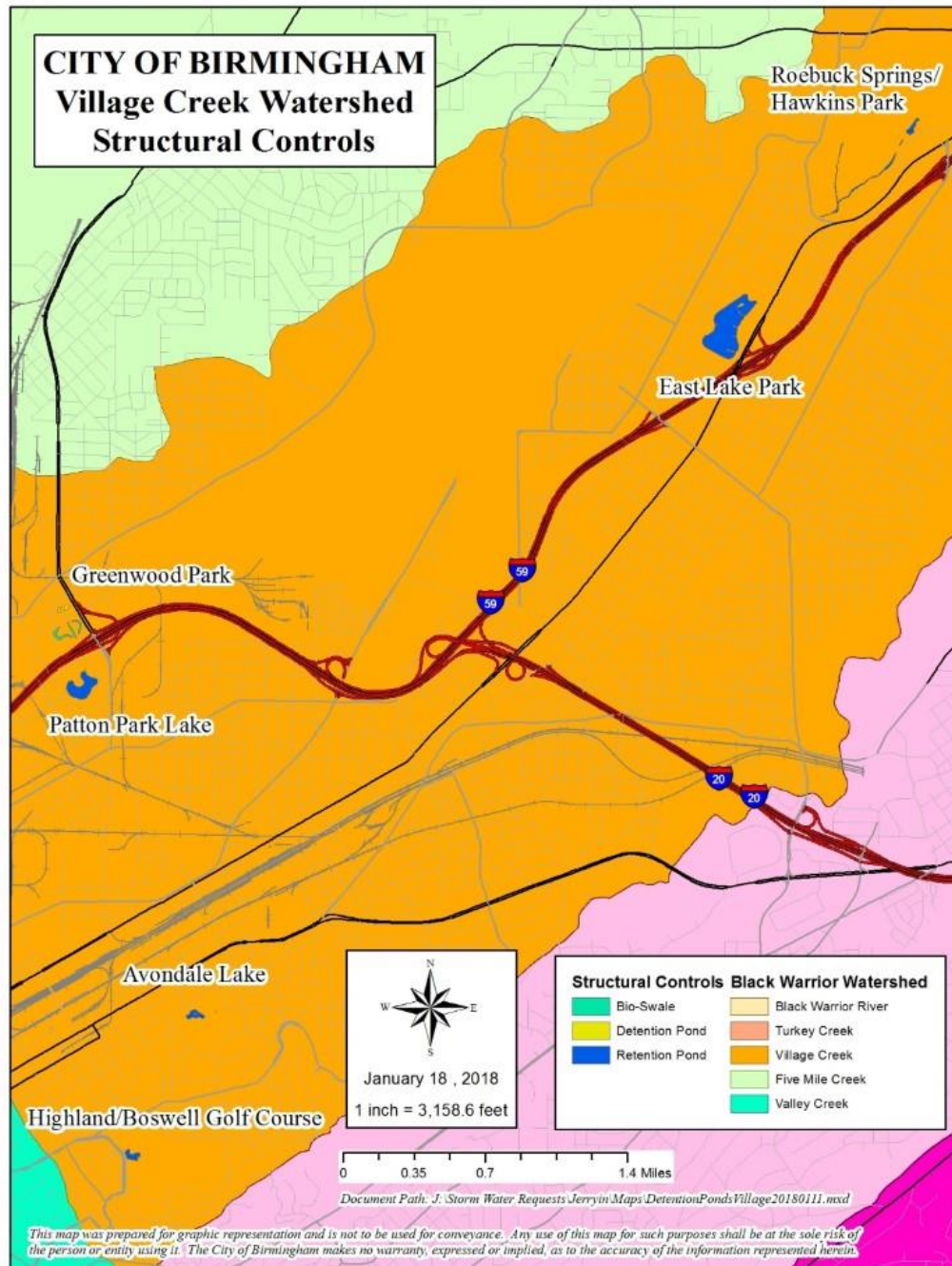
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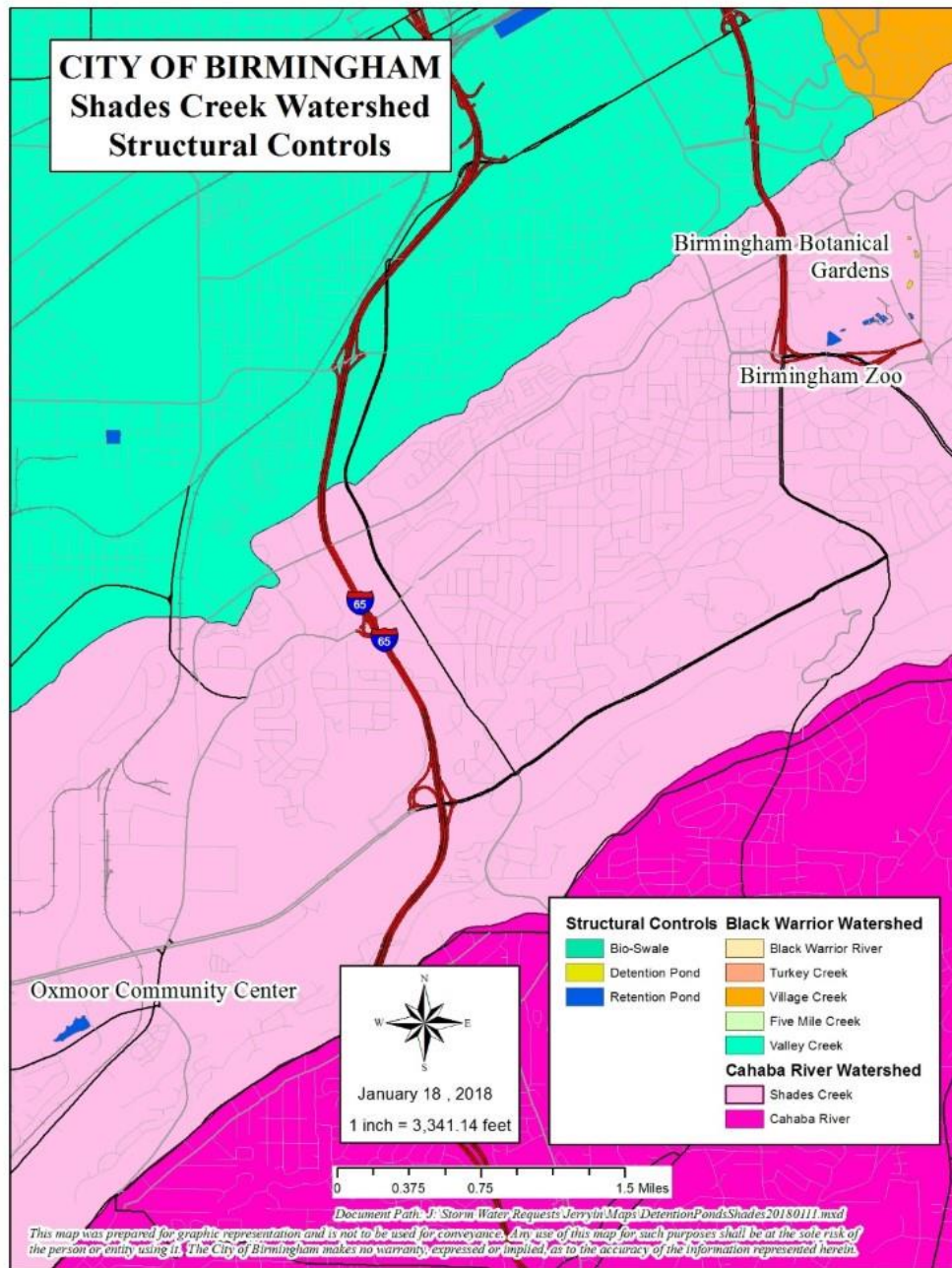


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PUBLIC EDUCATION AND PUBLIC INVOLVEMENT

CREEK AND NEIGHBORHOOD CLEANUPS:

The objective of the Clean Neighborhood Initiative Program is to remove blight, trash, and litter from every area of the City, as well as educate and promote behavior changes for all citizens to practice good stewardship and sustainability within their community and City. There are twenty-three communities throughout Birmingham, which represent ninety-nine neighborhoods

On November 28, 2017 a new initiative began called, **“Putting People First”**. Significant progress has been made under the new initiative. The emphasis has not been on recording data but on, **“Building Communities through Servant Leadership”**, and to focus on **“Putting People First.”** This initiative continued through 2019 reporting year.

The, “Keep America Beautiful”, and “Keep Birmingham Beautiful”, programs have provided us with resources such as, “The Great America Cleanup” campaign. “The Great American Cleanup” prompts individuals to take greater responsibility for their local environment by conducting grassroots community service projects that engage volunteers, local businesses and civic leaders.

During this reporting period under the “Great American Cleanup” Campaign computed 60 neighborhood cleanups, collecting over 3,000 bags of trash and 200 bags of recyclables, utilizing around 555 volunteers.

This program and many partnerships will continue throughout the city until all community areas have been properly cleaned. The City is anticipated to overcome much of the trash and floatable materials that make its way to the streams and rivers throughout the City:

WATERSHED	# OF CLEAN-UPS	TONS	VOLUNTEERS
CAHABA RIVER	5	1.23	48
SHADES CREEK	1	3.5	140
VALLEY CREEK	11	8.785	604
VILLAGE CREEK	6	19.53	530
FIVE MILE CREEK	-	-	-
TOTAL	23	33.04	1,322

A total of 6 cleanups were held along Village Creek resulting in 530 volunteers removing 19.53 tons of debris and tires. All cleanups were held in partnership with the Village Creek Human and Environmental Justice Society, Jefferson County Stormwater Management, and Jefferson County Commission. Items collected were removed by the City of Birmingham Public Works

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Department or the County's R&TD. The County provided funding, while all partners provided volunteers, and materials for all the cleanup events to Village Creek Environmental and Human Justice Society. Details from each event is listed below.



- ★ On January 21, 2019, as part of the Hands on Birmingham Martin Luther King Jr. Day of Service Litter Cleanup Project, 277 people came together and removed a total of 10.99 tons of material. The items collected were picked up and disposed of by the City of Adamsville and the County's R&TD. This project consisted of 17 hosting / supporting organizations, 4 volunteer registration locations (Minor High School, Docena, Mulga Mines and Edgewater B), 4 communities (Adamsville, Docena, Mulga Mines and Edgewater B), 3 jurisdictions (City of Adamsville, City of Birmingham and Jefferson County Commission) and 2 local schools (Minor High School, Minor Middle School) This project was coordinated by a working committee with representatives from

Hands on Birmingham; Jefferson County Commission; Jefferson County Department of Health Watershed Protection Program; Minor Middle School; Minor High School; Village Creek Human and Environmental Justice Society, and City of Birmingham Stormwater Management.

- ★ On March 23, 2019, an event and cleanup project was spearheaded by the Village Creek Human and Environmental Justice Society in conjunction with the University of Alabama's "Into the Streets" program. It was coordinated by a working committee with representatives from the Alabama People Against a Littered State (AL PALS), Jefferson County Stormwater Management, City of Birmingham Stormwater Management, Jefferson County Commission, Jefferson County communities of Minor Heights and Edgewater B, Jefferson County Department of Health Watershed Protection Program, Storm Water Management Authority, Inc., Town of Maytown, Town of Mulga, University of Alabama Birmingham, along with the faith based community organizations such as First Baptist East Mulga, FOAM Ministries, Open Door, St. John's Baptist and Westmont Churches. UAB students along with volunteers from neighboring communities participated in a cleanup along Mulga Loop Road as part of UAB's "Into the Streets" program whose mission is to encourage partnerships that improve education, health,

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economic prosperity and quality of life through service at home and around the globe. This project consisted of 2 volunteer registration locations, 5 communities, 5 faith-based organizations, and 4 jurisdictions coming together to pick up litter along roadways and ditches along Mulga Loop Road and Bayview Lake Bridge protecting the Village Creek Watershed from pollution. A total of 155 volunteers removed 7.14 tons of material from along Mulga Loop Road. Jefferson County's R&TD picked up and removed the items that were collected.

- ★ As part of the *Renew Our Rivers* Program, the Village Creek Fall Cleanup was held on September 12-14, 2019. Volunteers along with the Birmingham Fire and Rescue Service, Vulcan Materials Company, City of Birmingham and Jefferson County Commission participated in a cleanup in Village Creek conducted by the Village Creek Society and the Alabama Power Company on September 12-14, 2019.
- ★ As part of this event, a community wide cleanup was also promoted to have local residents pick up trash and debris along roadsides on September 14, 2019. A total of 150 volunteers from the local community, various schools and supporting partners removed 2.5 tons of debris and trash.

A total of 5 cleanups took place along the Cahaba River. Reports show that 48 volunteers removed 1.23 tons of trash and

tires. Details from each event is listed below.

- ★ Church of the Highlands, located along Grants Mill Road, spearheaded 5 roadsides cleanups to prevent litter and trash from entering the Cahaba River. One of the events was part of their Annual *Day of Service* project, the other five were a part of an outreach group that does various projects in the neighboring communities. All items collected during these cleanups were placed in the Church's dumpsters. On October 2, 16 volunteers picked up 0.315 tons of litter
- ★ December 1, 4 volunteers picked up 0.03 tons of trash and tires;
- ★ February 2, 2 volunteers picked up 0.045 tons of litter;
- ★ April 6, 9 volunteers picked up 0.33 tons of litter;
- ★ July 13, 17 volunteers picked up 0.51 tons of litter.
- ★ A Big Cahaba River Cleanup was scheduled for June 6, 2019. This event was spearheaded by the Cahaba River Society and included 7 cleanup sections stretching from the headwaters to Helena. While weather prevented this river cleanup from taking place, 3 weeks prior to the cleanup a massive education campaign about how litter impacts local waterways was released including a series of anti-litter radio advertisements in the metro area along with the first two installments in a series of short, educational videos about litter pollution. Public Service

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Announcements were promoted on social media and local radio stations.

A total of 1 creek cleanup was held along Shades Creek during this reporting period resulting in a total of 140 volunteers removing 3.5 tons of debris and tires.

- ★ On September 28, 2019, 140 volunteers removed 4 ½ heaping pickup truck loads (3.5 tons) of trash and tires during the 21st Annual Shades Creek Cleanup. Jefferson County Stormwater Program provided the trash bags, gloves and backpacks for this event.



In conjunction with the Renew Our Rivers Program, a total of 11 cleanups were held along Valley Creek. The volunteer lead

cleanups were held on March 16, 2019 and September 28, 2019 with three prior municipal work days to remove the heavier items on March 14, 2019, September 26, 2019 and September 27, 2019. These biannual cleanups focused on public awareness and trash removal throughout the Valley Creek Watershed. The cleanups were coordinated by the municipalities throughout the watershed, various agencies, and a coalition of local citizens and businesses.

- ★ For the Spring Biannual cleanup held on March 16, 2019, there were 6 volunteer site registration locations for the volunteers. A total of 375 volunteers removed 3.515 tons of debris and 0.353 tons of tires.
- ★ For the Fall Biannual cleanup held on September 28, 2019, there were 5 volunteer site registration locations for the volunteers. A total of 229 volunteers removed 5.27 tons of debris and 343 tires including 15 large truck tires.

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EDUCATION OPPORTUNITIES:



Family Fishing Rodeo: On June 8, 2019, the Clean Water Awareness Campaign posters were displayed at a booth along with a fun interactive activity for children at an event that was free and open to the public. Trash bags and information on the volunteer litter cleanup events were distributed. A visual display showcased how used motor oil and used cooking oil and grease can impact the environment when not disposed of properly. In addition, a glass jar containing various common pollutants rainwater carries to local waterways during rain events was displayed and available for patrons to examine and shake to mix the contents. Cooking oil and grease recycling containers were distributed along with other printed materials on Jefferson County's Household Oil and Grease Recycling Program along with a current list of all the local Recycling Centers. Stormwater Program staff and the City of Birmingham Stormwater Program staff shared this booth and assisted in the

kid's water blot painting activity. In addition to creating attractive artwork, the painting activity also taught children the properties of oil and water which reinforced the visual display showing that oil and water do not mix. It was reported that close to 500 people attended this annual event held at the East Lake Park.

Jefferson County Water Festival:

Stormwater Program staff serve on the festival committee that planned the Fifteenth Annual Jefferson County Water Festival to be held the week of May 13, 2019, at Samford University. Unfortunately, the venue was not available while the students could attend and therefore this event had to be rescheduled. The new date for this event is October 15, 2019. The Water Festival is geared to educate fourth grade students, teachers and parents from various schools from across Jefferson County about where drinking water comes from and how to protect and keep it clean for themselves and future generations. Students participate in three hands-on activities and experiments and attend the Fishing Magicians magic show. All of the hands-on activities directly correlate with the Alabama Course of Science Study and SAT Objectives for fourth grade. Prior to the festival, students from participating schools submit artwork depicting the Water Festival theme, Be A Water Hero, chosen for this year. The festival committee, spearheaded by the JCSWCD selects one winner whose artwork will be used as the Water Festival logo on free t-shirts distributed to participating students, teachers and volunteers.

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Homebuilders of Alabama Association Annual Workshop:

The County's Stormwater Program assumes responsibility for hosting and coordinating an Erosion and Sedimentation Control (ESC) workshop on a rotational basis with the Jefferson County Department of Health, the City of Birmingham, and the City of Bessemer. Staff entered into a partnership with the Homebuilders Association of Alabama (HBAA) to provide its ESC workshops and maintain a database of attendees. A total of 19 people attended the HBAA ESC Workshop on April 16, 2019. The purpose of these workshops was to provide appropriate education and training measures for construction site operators and municipal staff as required in ALS000032 and to reduce the impact of erosion and sedimentation in waterways. Educational materials were distributed at the workshops. The *Field Guide for Erosion and Sediment Control on Construction Sites in Alabama* is distributed to attendees of the Erosion and Sediment Control Workshops for single family homebuilders. *Field Guides* in Spanish are available and will be distributed to Spanish speaking attendees as needed.



Prescription Drug Take-Back Events:

Stormwater Management staff did not promote National Prescription Drug Take-Back Events held in the Jefferson County area during this reporting period. We plan to promote and report this event in the upcoming report. These events are designed to promote safe and proper disposal of unwanted or expired medications, and to prevent drugs from being flushed down toilets and ending up in waterways. Over 456 tons of medication have been collected during these events according to the Drug Enforcement Administration. Materials to promote this program were available in both English and Spanish and in various formats (posters, handouts, etc.). The Drug Enforcement Administration (DEA) published its Notice of Proposed Rulemaking for the Disposal of Controlled Substances in the Federal Register Dec 21, 2012. The proposed regulations seek to implement the Secure and Responsible Drug Disposal Act of 2010.

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Keep Birmingham Beautiful: The mission of the Keep Birmingham Beautiful is to serve the citizens of Birmingham



by developing and

implementing effective public education and community involvement programs, which enhance the quality of life in beautification and environmental concerns. The objective of the Organization is to affect positive change in attitude and behavior regarding natural conservation, littering, recycling and beautification. KBB and the City of Birmingham collaborated in numerous events within this reporting period. In a previous reporting period, in an effort to promote the proper disposal of cigarette butts, the Stormwater Program in partnership with Keep Birmingham Beautiful (KBB) and City Action Partnership (CAP) created a sticker which was placed on 59 cigarette receptacles.

Household Hazardous Waste Recycle:

This event allowed residents of Jefferson County to safely dispose of electronics, appliances, motor oil, small engines, batteries, CFC container devices, paint, ammunition and paper for shredding free of charge. This event is coordinated by the Jefferson County Household Hazardous Waste Day Committee made up of several local agencies to include the Alabama Cooperative Extension System, Alabama

Environmental Council, City of Bessemer, City of Birmingham, Jefferson County Commission, Jefferson County Department of Health, Keep Birmingham Beautiful, and the Storm Water Management Authority, Inc. The past year was used for planning this event, which was held on April 20, 2019.

Both Fairfield and Irondale reached full capacity for items collected. The Irondale site saw a participation of 727 citizens collecting a total of 101,628 lbs. The Fairfield site had a turnout of 215 citizens and received 33,469 pounds of materials. Some materials accumulated included paints, electronics, cooking grease, pesticides, fluorescent lights, and many others. The total materials accumulated across both sites was 135,097 lbs.

Brown Bag Lunch and Learn Seminars:

Stormwater Program staff, in partnership with the Friends of the Birmingham Botanical Garden, Alabama Cooperative Extension System, Alabama Green Industry Training Center, and Jefferson County Stormwater, created a series of free informational seminars called *The Brown Bag Series*, 14 of which were held during this reporting period. The seminars were held at the Birmingham Botanical Gardens; were open to all residents of Jefferson County; were promoted in the JeffCo H2O Newsletters, blogs and partner websites; and flyers were distributed at community events and meetings. Instructors from varying organizations were chosen for each topic. The topics, intended to be of practical application to homeowners, included the stormwater benefits to low impact

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landscape designs, proper planting and gardening techniques, and prudent use of fertilizers and pesticides. There were 762 participants during this reporting period. The topics were: "Show Stoppers", March 20; "Invasive Plants", April 3; "Southern Favorites", April 17; "Spatial Planting of Veggies", May 1; "Organic Pest Control", May 15; "Growing and Arranging Flowers for Indoor Displays", May 29; "Seed Saving", June 12; "Pollinators", June 26; "Critters", July 10; "Hire A Professional", July 24; "Permaculture", August 7; "Alabama Top Outdoor Spots", August 21; and "Propagation", September 4 and "Ask the Experts", September 18, 2019.



Rain Barrel Workshop: On June 15, 2019, 42 people participated in a Rain Barrel Workshop that was held at the Birmingham Botanical Gardens. Through a working Rain Barrel Workshop Committee, the ACES, AEC, BBG, City of Birmingham, City of Bessemer, Jefferson County Department of Health, JCSWCD, Jefferson County DDS, Keep Birmingham Beautiful and Storm Water Management Authority hosted the event and provided instruction, materials, and rain barrel assembly assistance for

participants. Through various presentations on low impact development and green infrastructure practices, non-point source pollution, drip irrigation, runoff calculations and the basic ways to install rain collection systems including cisterns, the participants learned the benefits of capturing and storing rain water from their roof and how best to reapply the water in their yard. Jefferson County Household Oil and Grease Recycling Program containers and other items were distributed to all class participants and door prizes were awarded. The Committee publicized this event through flyers and social media. A post evaluation was given, and the results are included. The Committee members plan to offer more frequent Rain Barrel Workshops to the public in 2020 at various venues including one at the Birmingham Botanical Gardens on June 20, 2020.

Electronic take back at Adamsville Walmart and Center Point Courthouse:

Citizens of Birmingham, CenterPoint, various unincorporated Jefferson County communities, and the Pinson area were invited to recycle their old household electronics. The following were accepted at the drop off: audio equipment, batteries, cable boxes, cell phones, computers, projectors, chargers, GPS units, fitness trackers, scanners, security, and small appliances. Cassette tapes, CDs, DVDs, large appliances VHS tapes, and wooden speakers were not allowed.

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Stormwater Management participated in the two electronic take back recycling events for the citizens of the City of Birmingham and residents of Jefferson County. Along with the Jefferson County Stormwater Program. Stormwater Management collected computers, TVs, batteries, and other electronic devices at two locations on July 27, 2019 and again on August 10, 2019. The July 27 event collected 2,794 lbs. of electronic equipment. The August 10th event collected 11,506 lbs. of electronic equipment. Approximately 7.15 tons of material were recycled, preventing the materials from being disposed of in landfills. Other organizations participating included KBB, Alabama Environmental Council (AEC), Village Creek Society, and Protech Recycling. Metrics and information were collected from participants including types of items and information for the future planning of other HHW events.

Alabama Environmental Council: To promote proper disposal of various household items, the City of Birmingham partnered with Alabama Environmental Council (AEC) on its recycling program, Recycle Alabama. The Stormwater Program staff promotes Recycle Alabama through its Jefferson County Clean Water Awareness Campaign posters, newsletters, presentations and events. The AEC runs a nonprofit recycling center in downtown Birmingham which accepts textiles, plastics, glass, metal, cardboard, paper and other items. AEC created and promotes Recycle Alabama through its website (www.recycAL.com) and printed materials.

Under the Recycle Alabama campaign, AEC in partnership with Jefferson County Department of Health, the University of Alabama at Birmingham, Jefferson County Commission and several municipalities organized the purchase and distribution of recycling drop-off trailers. There were 10 trailers distributed to various outlying communities in Jefferson County that do not have recycling opportunities. The recycling trailers have a modified version of the *Trash Blows! Tarp and Tie Your Load* poster prominently displayed to remind those dropping off materials that even recycled materials can become litter that can pollute our waterways of stormwater pollution prevention outreach efforts.

Urban Forestry Fair: The Urban Forestry and Conservation Fair was held on Wednesday, February 20, 2019 at Birmingham's Boutwell Auditorium. Two hundred (200) 5th grade students, teachers, and chaperones representing three schools and three school systems attended the fair. They were Oxmoor Valley Elementary from Birmingham City Schools, CJ Donald Elementary from Fairfield City Schools, and Adamsville Elementary from Jefferson County Schools. In addition, six FFA members from McAdory High School (Jefferson County Schools) assisted at the event.

The partners who helped make this event successful by providing presenters for the stations were: Alabama Forestry

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Commission, Alabama Master Gardeners & Friends of Birmingham Botanical Gardens, Alabama 4H Cooperative Extension, Alabama Department of Conservation and Natural Resources, Freshwater Fisheries, Birmingham Stormwater Management, Camp Fletcher (CampFire USA), Jefferson County Emergency Management Agency, Jefferson County Farmers Federation, Jefferson County Stormwater Management, Keep Birmingham Beautiful, McAdory High School FFA, McWane Science Center, Regions Bank, Ruffner Mountain, Society of American Foresters (Cahaba Chapter), Southern Research Institute, the St. Clair and Walker County Conservation Districts, and the United States Department Agriculture, Natural Resources Conservation Service. Classroom guides were provided by Birmingham AmeriCorps and the Jefferson County Conservation District Board of Supervisors. Alabama Forestry Commission provided trees to the Fair while event location support was provided by the staff of the Boutwell Auditorium, the City of Birmingham Department of Planning, Engineering & Permits, Jefferson County Conservation District, and the USDA Natural Resources Conservation Service. As always we are indebted to Golden Flake Snack Foods for their generous contribution of chips to this event and to Winn-Dixie and Arby's Restaurants for their support.

The activities presented were: Tree Cookies, Weather or Not, Skins and Skulls, Build-a-Habitat, Magic Sand, Owl Pellets, Fish ID Trunk, Tree Adoption, Rethink Recycling, Water Jeopardy, Wood or Not, Build-A-Tree,



Birds and Worms, Deadly Links, Know Where It Goes, Oh Deer! and Everyone Lives in a Watershed. In conjunction with the Fair and to

celebrate Alabama Arbor Week, oak tree seedlings were provided by Alabama Forestry Commission and were available to all the students and teachers who attended the fair.

Fifty-seven (57) volunteers provided 334 hours of service to the event worth \$8,246. Funding was provided by the Jefferson County Conservation District and the Jefferson County Farmers Federation. The total value of the project, considering donations, volunteer time, administration, and in-kind support was \$18,107.



Do Dah Day: On May 18, 2019, Stormwater Program staff displayed Clean Water

Awareness Campaign posters at a booth during the event. In addition, Stormwater Program staff reached out to residents from the surrounding community to assist with placing in a *Perfect World* and *It's Your "Doody"* posters on approximately 20 porta-potties set up for the event. Stormwater staff from the City of Birmingham, with which Jefferson County Commission has a memorandum of understanding (MOU), assisted in distributing materials during the event. The *It's Your "Doody"* flyer, household oil and grease containers, stormwater calendars, backpacks, brochures on vehicle maintenance, yard products and illicit discharge brochures along with free pet waste bags were distributed to attendees. The purpose of Stormwater Program staff participation in this event was to bring about awareness of the impacts of pet waste on local water quality and the benefits of pet friendly landscaping to reduce PHF as well as erosion and sedimentation. A fun and interactive poo toss game was offered to teach people the proper behavior for pet waste disposal. Approximately 500 pet waste bags and flyers were distributed. The Do Dah Day Board estimated that between 8,000 and 10,000 people attended this event.

Minor High School Outdoor Classroom:

Stormwater staff worked hosted and invited many others to participate at an outdoor classroom event with Minor High School on February 21, 2019. Floodplain Management, Jefferson County stormwater staff, Cahaba River Society, Village Creek Society, and Keep Birmingham Beautiful

staff set up multiple stations for the students to rotate through. Each station allowed the students to work through scenarios involving flooding, stormwater management, and recycling initiatives.

All-Hazards Awareness Week: The City of Birmingham's annual All-Hazards Awareness Week was held during the week

of April 22-April 26, 2019. Monday, April 22, sessions included: Community Preparedness: Implementing Simple Activities for Everyone and a Hazard Information Table at Birmingham City Hall.



Tuesday, April 23, sessions included: EC's Made Easy: Elevation Certificate Basics. Wednesday, April 24, sessions included: a Safe Room Tour of South Hampton Safe Room and Collaborative Partnerships to Advance Resilience Planning. Thursday, April 25, sessions included: Stormwater: "Only Rain Down the Drain" and a CFM exam review. Friday, April 26, sessions included: CFM Exam.

Earth Day at the Garden: On April 20, 2019, the Clean Water Awareness Campaign posters were displayed at a booth along with

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a fun interactive activity for the kids at an event that was free and open to the public. A visual display showcased how used motor oil and used cooking oil and grease can impact the environment when not disposed of properly. In addition, a glass jar containing various common pollutants rainwater carries to local waterways during rain events was displayed and available for patrons to examine and shake to mix the contents. Cooking oil and grease recycling containers were distributed along with other printed materials on Jefferson County's Household Oil and Grease Recycling Program along with a current list of all the local Recycling Centers. JCSWCD staff, with which Jefferson County Commission has a memorandum of understanding (MOU), Jefferson County Stormwater Program and the City of Birmingham Stormwater Program shared this booth and assisted in the kid's water blot painting activity. In addition to creating attractive artwork, the painting activity also taught children the properties of oil and water which reinforced the visual display showing that oil and water do not mix. It was reported that close to 400 people attended this annual event held at the Birmingham Botanical Gardens.

Cooking Grease Campaign: The County's Environmental Services Department (ESD) administers a county-wide household cooking oil and grease recycling program to reduce the amount of cooking oil that enters the sanitary sewer system, thereby reducing sewer overflows. This is a free service to all of the citizens of Jefferson County. Collection



bins are located at several sites around the county with free plastic containers for residents to take home. Once a container is filled, it can be returned to the collection bin and exchanged for a clean container. The containers are collected weekly by the Grease Control Program inspectors and the oil is picked up at the Shades Valley Wastewater Treatment Plant by local rendering companies. Grease and oil accumulate in the sewer system and require diligent maintenance to prevent sanitary sewer overflows. ESD developed this program in the ongoing effort to the prevent overflows and protect the water resources. The bins were constructed by the County's General Services shop and are 4' wide by 4' tall and 2' deep and sit on legs 6" off the ground. The bins sit in a hard, durable plastic tray which provides a liquid retention barrier should a container leak or spill. There are currently 21 drop-off points within Jefferson County and 5 in the City of Birmingham that accept filled containers for recycling, which is an increase of one new site from last year. (Please see Program

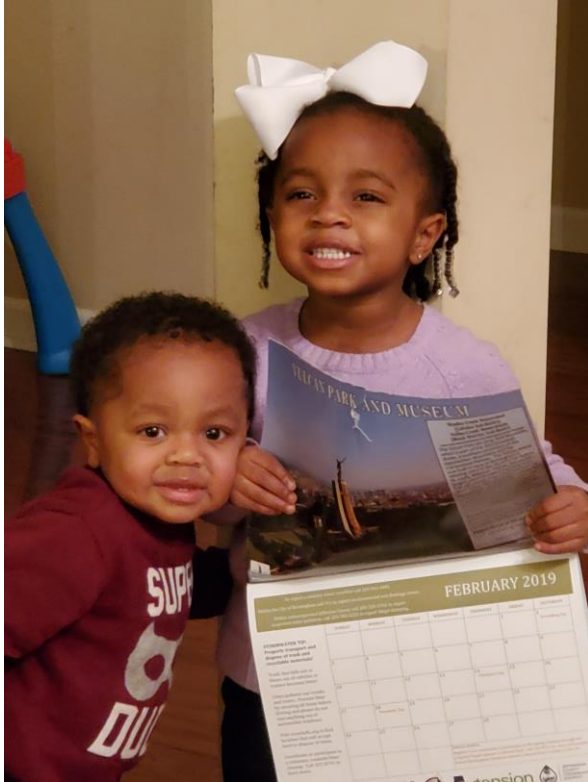
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Element Hazardous Household Waste
Section).



Stormwater Calendar: A 12-month printed 2019 calendar was created in partnership with Jefferson County Stormwater to provide a cost effective way to educate the citizens of Jefferson County about watersheds and their impact on local water quality. Each month the calendar highlights a venue with a photo as well as a description of its unique features and attractions. The venues were chosen based on their contributions to reducing pollution in stormwater runoff and improving water quality in local creeks and streams through their preservation, conservation, restoration and education initiatives. The

calendar was designed to encourage residents to visit the featured locations and experience the unique ways in which each venue portrays our County's past, shapes our future and contributes to their quality of life. In addition to the venues, each month highlighted the stormwater complaint reporting hotline number and the sanitary sewer overflow reporting information. Also included monthly were various stormwater tips that focused on a pollutant and the negative effects that pollutant has on local water quality along with simple prevention strategies people can incorporate in their everyday life. The helpful tips will assist people to become better stewards of their communities and watersheds. The calendar also featured the negative impacts that Wild Taro, *Colocasia esculenta*, is having on our local waterways and that this invasive plant is traveling through our local storm drain system. Helpful information on how to become more involved with the Wild Taro removal project was highlighted. The front and back of the calendar featured Vulcan Park with its iconic Vulcan statue. The Vulcan statue sits atop Red Mountain, which is part of the Red Mountain divide, a southern extension of the Appalachian Mountains and the Cumberland Plateau. Since this geological feature helps form our local watersheds, a map of Jefferson County was included to visually display the 2 major watershed basins (Black Warrior and the Cahaba), the 10 Sub-basins, and how they are located within the larger Mobile Drainage Basin. These calendars were used in various education programs as

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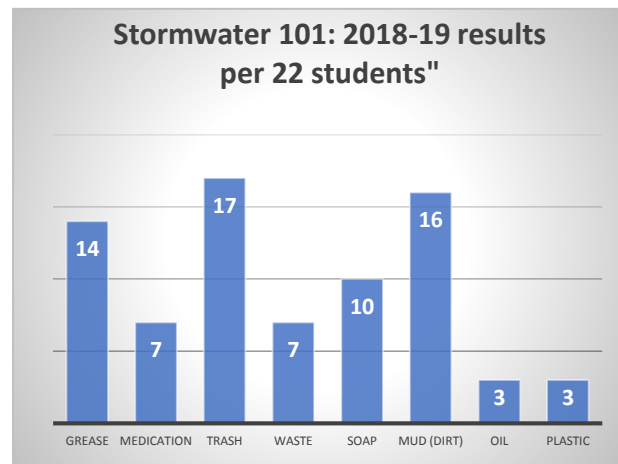
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an easy visual to talk about watersheds given that the Vulcan statue faces the Black Warrior River Sub-Basin and the Cahaba Sub-Basin is behind him. A total of 3000 calendars were printed and distributed, with 1,500 of those distributed in unincorporated Jefferson County communities.



Stormwater 101: Only Rain Down the Drain Presentations: During the last two reporting period City of Birmingham Stormwater Management Staff Presented “Only Rain Down the Drain” to over 358 Birmingham City Students ranging from k-12th graders over several different events.

Staff also presented “Only Rain Down the Drain” to over 413 adults at several different events during this reporting period. “Only Rain Down the Drain” presentation concept was developed by staff to explain Stormwater Management to all ages. Instilling and providing City residents with good environmental qualities and stewardship will help to keep Birmingham beautiful. Reaching out to our children will help to guide the next generation of Birmingham residents with the need to continue to improve City water resources into the future.



Stormwater 101 Surveys: During this reporting period Stormwater Management Staff survey to go along with the “Stormwater 101” education to quantify knowledge and information retained. The figure below shows the responses from three events with adults and students that were asked, “What are some of the items we discussed today that are not allowed in the storm drain?”

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Stormwater 102: Field Water Quality

Analysis: City of Birmingham Stormwater Management Staff developed "Stormwater 102." We use this program to teach and train citizens about the importance of clean water. We allow them to use our equipment to perform water quality analysis in the field. We use this technique to encourage scientific reasoning as well as teach basic stormwater management techniques.

Public Outreach Materials: The Birmingham Stormwater Management program developed and distributed many Educational Items to help get the message out to our citizens. The goal was to make a brand for Stormwater Management. "Only Rain Down the Drain" pencils, cups, Frisbees, bumper stickers and wristbands were distributed throughout the City with the message, as well as, Stormwater Calendars. A City of Birmingham Stormwater Banner, and table cloth was purchased to advertise the message. Plans to increase the stormwater awareness and advocacy through public education are expected to expand throughout upcoming years.

Stormwater Management Website:

During the annual report year, Stormwater Management has a fully functional working website for stormwater information to be located. The website can be found at: www.birminghamal.gov/stormwatermanagement.

The website contains a Home, Public Education, Annual Report, FAQs, Contact, and Related Link sections. The Home Page

gives a brief description about stormwater and how citizens can help reduce pollution in their community. It also helps inform the citizens about watersheds in Birmingham, native plants for stormwater management practices, recreational uses, the City of Birmingham Soil Erosion Control Program, & etc.

Birmingham Stormwater Facebook Page:

During the annual report year, Stormwater Management has a fully functional working Facebook page for stormwater information to be located. The Facebook page address is <https://www.facebook.com/COBPEP>.

This Facebook page will allow us to gain easy access to citizens, publicize upcoming events, and help educate citizens in environmental stewardship and stormwater management, as well if be a location for other department wide information.

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Litter Quitters - Video Competition:

Litter Quitters is anti-litter, stormwater-protection video competition launched in 2018 for public high schools located in Jefferson County, Alabama. It is aimed at young drivers, tasking them to produce up to a 60 second video to educate their family and friends about the negative impacts of litter on the local waterways and environment in general. Each participating school submits one video to the committee which reviews and approves the video. Videos are then loaded to a YouTube channel where the students hold a massive social media campaign to encourage the general public to watch their video on the YouTube Litter Quitters channel, and most

importantly 'like' their video. The videos with the most 'likes' at the end of the competition win cash prizes.

Litter Quitters is a project that is spearheaded by the Jefferson county Conservation District in partnership with a working committee made up of the following organizations (listed in alphabetical order): City of Birmingham, City of Bessemer, City of Hoover, City of Leeds, Creative Directions, Inc., Freshwater Land Trust, Jefferson County Commission, Jefferson County Department of Health, Keep Birmingham Beautiful, and Stormwater Management Authority, Inc.



The 2019 *Litter Quitters* competition was open for 12 days starting April 10 and ending on Earth Day proper - April 22 at 11:59pm. In an effort to keep the schools engaged and focused on their local watersheds, the schools were divided into 3 major watershed basins: North- Locust Fork; West - Valley Creek; and East - Cahaba. Each school competed for cash

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prizes against only the other schools in their watershed basin, thereby keeping the competition on a local level. All videos can be viewed on www.LitterQuitters.org.

A total of 30 public high schools were invited to participate in the competition. A Power Point presentation which included information about Jefferson County's local waterways, litter and its negative impact on the environment along with competition details, was given to a total of 764 students from 23 schools. Only 22 schools submitted videos into the competition.



As part of the 2019 project, participating schools were invited to send 1 student representative to take part in a professionally produced message / public service announcement that will air on local television. This paid message allows the Litter Quitters Committee to market this anti-litter message to a broader audience – the general public which used the voices of Jefferson County high school students to tell the message. A total of 10 schools

participated in this message which was funded in part by the Cawaco RC&D and other organizations listed under the 2019 sponsors.

The ultimate goal of this project is to have high school students become change agents within their spheres of influence about the harmful issues that roadside litter causes across Jefferson County. This age group is vital to educate given they are the demographic which studies show are more likely to toss things out of vehicle windows. By providing them with information about the harmful negative impacts of litter to our waterways and environment they can exert influence on their peers, family and friends to properly dispose of their trash.

Litter Quitters winners won \$1,000 for 1st place; \$500.00 for 2nd place; \$250.00 for 3rd place. Since the competition was run concurrently in 3 watershed basins, there were a total of 9 winners. Winners were based on the number of 'likes' their video received on the YouTube Channel. During the 12-day competition the YouTube Litter Quitters channel received 35,377 views.

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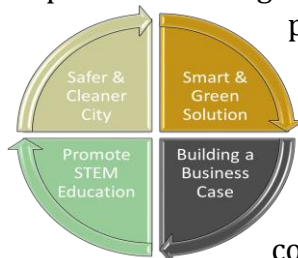
Only Rain Down the Drain Street Signs:



During the summer of 2016, The City of Birmingham Stormwater Management, in collaboration with KBB, designed and placed 21 “Do Not Litter” and “Only Rain Down the Drain” signs around high traffic areas with Birmingham

city limits. In addition, on the “Only Rain Down the Drain” message, the signs included the individual watersheds for sign locations, making the public aware of the impacts of littering in the affected watersheds. Planning has begun in this reporting period to place more signs throughout the City.

Put a Lid On It: As part of a City of Birmingham project, the City has partnered with UAB to develop and produce an inlet top

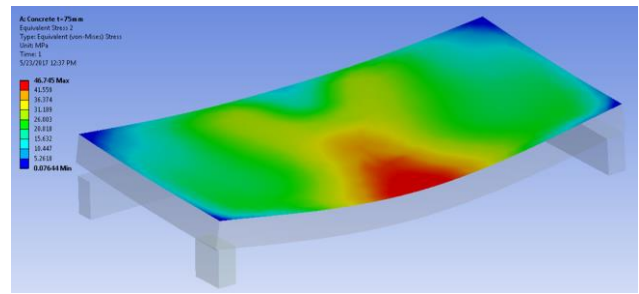


redesign. During this reporting period UAB has studied and tested many different composite material combinations and designs to be considered as the final

product. There was also a study done on the current material and process used to make the standard concrete tops used today. Initiation of the video study in four

frequently damaged areas process has begun.

Staff has worked through a preliminary portion of the pilot project and is close to completing the pilot project. UAB has requested that the project be extended for one additional year.



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Program Overview

Please see the following chart to demonstrate the education program pollution control measures versus each education program element. The goal is to maximize each opportunity we have to educate.

Major Accomplishments:

- ★ Stormwater Website and Facebook page improvements
- ★ Litter Quitter campaign improvement
- ★ Partnering with KBB

Program Strengths:

- ★ Stormwater 101
- ★ Partnerships
- ★ Webpage & Facebook

- ★ Stormwater Calendar
- ★ Litter Quitter initiative

Program Weaknesses:

- ★ 100% Participation in Roadside Cleanups (all 18 communities)
- ★ Stormwater Signage
- ★ Trash

Future Direction:

- ★ Put a Lid on It Project
- ★ KBB School Ambassador Program
- ★ Educate every Birmingham student before they graduate High School
- ★ City-wide Cleanups
- ★ Extend Partnership Opportunities

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Education Pollution Control Measures		16	15	15	21	23	17	23	17	15	15	11	18	20	7	10	20	23	16	23
Education Opportunities		16	15	15	21	23	17	23	17	15	15	11	18	20	7	10	20	23	16	23
Brown Bag Lunch and Learn	Animal Waste	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Calendar	Automobile Fluid	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Centennial Tree Program	Automobile Washing																			
Clean ups	Citywide Beautification	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cooking Grease Campaign	Conservation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Do Dah Day	Cooking Grease	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Drug Take Back	Environmental Stewardship	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Earth Day At The Gardens	Flooding																			
Electronic Take Back	Green Infrastructure																			
EMA Be Ready Day	Household Waste	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Facebook Page	Industrial Waste	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fishing Rodeo	Leaves and Grass Clippings	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Friends of Birmingham Botanical Gardens	Littering	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Jefferson Cou Water Festival	Low Impact Development	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Plant Dig	Medicine Flushing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Seedling Give Away	Recycling																			
Stormwater 101	Residues, Herbicides and Fertilizers	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Stormwater 102 Water Quality Testing	Safety	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Stormwater 103 Water Quality Drainage-Flooding	Soil Erosion Control	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Stormwater Signage	Water Quality	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Urban Forestry Fair	Total Pollution Control Measures	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Video Competition(Litter Quitters)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Website		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TOTAL EDUCATION ELEMENT COUNT		16	15	15	21	23	17	23	17	15	15	11	18	20	7	10	20	23	16	23



ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDD&E)



The City of Birmingham is required by the Federal Clean Water Act (section 402(p)) through the National Pollutant Discharge Elimination System (NPDES), Municipal Separate Storm Sewer System (MS4) Phase I permit to implement an ongoing program to detect and eliminate illicit discharges into the MS4, to the maximum extent practicable (MEP). This program, at a minimum,

consists of procedures for: (1) dry weather screening to identify IDD&E sources, (2) tracing and eliminating the suspected source of illicit discharge, (3) notifying the Alabama Department of Environmental Management (ADEM) of suspicious discharges from permitted facilities and/or other MS4 facilities, (4) public notification mechanism for reporting illicit discharges

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and (5) a training program for training city staff in the administration of the program element.

During this year's reporting period, city staff addressed a total of 25-illicit discharges: 11-were on-going; 13-were detected and eliminated, and 1 was referred to another Agency. (*Table 1-1*)

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TABLE 1-1 ILLICIT DISCHARGES/FACILITIES OBSERVED DURING 2018-19

DISCHARGE/FACILITY TO MS4	NON-COMPLIANCE NOTICE	NOTICE OF VIOLATION	ON-GOING/RESOLVED
DIRECT DISCHARGE			
★ 1925 18 TH STREET N			On-going
★ VALLEY CREEK (VC-0.1S)			On-going
★ 540 2 ND AVENUE N			On-going
★ 941 EDWARDS LAKE RD			Resolved
★ ELDER'S STREET			On-going
INDIRECT DISCHARGE			
★ STEEL CITY TAP			Resolved
★ BROTHER'S CARWASH			Resolved
★ STAY FRESH MOBILE CARWASH			On-going
★ ELITE CARWASH			Resolved
★ 917 10 TH AVE S (SOUTHERN HOME STRUCTURAL SPECIALIST)			Resolved
★ 4627 U S HWY 280 (DAYS INN)			Resolved
★ 3250 MESSER AIRPORT HWY			On-going
★ 7712 4 TH AVENUE SOUTH (HUNTER'S MOBILE CARWASH)			Resolved
★ ST VINCENT'S HOSPITAL			Resolved
★ 960 PIKE ROAD (MOBILE CARWASH)			Resolved
★ 20 TH STREET N & 6 TH AVENUE N			On-going
★ COLEMAN AUTO REPAIR			On-going
★ 2289 MORRIS AVE (BIRMINGHAM PARKING AUTHORITY)			Resolved
★ 3409 6 TH AVE S (ON THE WAY NOW)			Resolved
★ ENSLEY CARWASH & DETAIL			Resolved
★ FISH MARKET			Resolved
★ JUST BROTHERS			On-going
★ LIFESTYLE DETAIL			Resolved
★ EXCLUSIVE CAR CARE			On-going
★ TRAVIS CHICAGO STYLE BURGER (MOBILE FOOD TRUCK)			On-going



Stormwater Management addressed numerous complaints (several ongoing) this reporting year and partnered with a city-wide Coordinated Code Enforcement team that deals with various violations pertaining to property, vehicles, zoning/use of property, licensing, animal control, condemnable structures and other public nuisances. The goal is to implement better processes and business practices that allow code enforcement efforts across the city to be better coordinated and compliance driven from the point of violation assessment through notification of violation to final resolution of violation via compliance through an appeals board, city council, and/or municipal court. A summary of each ongoing investigation is listed below:

- ★ **1925 18th Street N (Wheeler Hunter)** Citizen's complaint concerning heavy equipment pushing limited dirt into Village Creek with no silt fences in place. Stormwater staff investigated and informed SEC inspectors for further investigation and resolution into land disturbance
- ★ **Valley Creek (VC0.1S)** During dry weather screening field personnel continue to observe intermittent discoloration to the creek, and IDDE staff continuously work with Public Works and Jefferson County Environmental Services. Staff were able to narrow down a small area during this reporting period. Next step is to possibly use a dye test or

camera to determine if there is a breach within the sanitary system

- ★ **941 Edwards Lake Road** Stormwater staff received a citizen's complaint of grey matter in a ditch next to a residential property. Upon arrival staff observed a sewage odor and contacted Jefferson County Environmental Services were notified of possible sanitary overflow and Zoning was notified of possible zoning violations from adjacent property owner
- ★ **Elder Street** – Staff continue to receive complaints of discoloration to creek. The most recent complaint involved a discharge that was traced from a neighboring municipality and entering City of Birmingham. Jefferson County Department of Health was notified for resolution
- ★ **Steel City Tap** Complaint from ADEM regarding business disposing of waste solvent into a ditch outside of building. Stormwater staff along with Birmingham Fire Department performed an inspection and informed Owner/Operator of violations and advised Owner of corrective actions needed prior to next inspection
- ★ **1225 Warrior Road (Brother's Carwash)** Last year's annual report, a citizen's complaint prompted an



investigation. No further activity has been observed at this location

- ★ **3020 12th Ave N (Stay Fresh Mobile Carwash)** Last year's annual report, a citizen informed Stormwater staff of an illegal carwash operating behind a local gas station. At time of inspection, staff observed activity but no visible wash water runoff entering the City's MS4. However, Zoning continues to work with the Property Owner and Business Owner to comply with Zoning violations
- ★ **1000 Vinesville Road (Elite Carwash)** Last year's annual report, a complaint prompted an investigation. No further activity has been observed at this location
- ★ **Southern Home Structural Specialist** Citizen notified staff of a contractor discharging a thick film of oil from a basement into City's MS4. Upon arrival, Contractor was pumping sludge waste material from a basement into a kiddie pool to be hauled off for disposal. Operator given a copy of the Stormwater Protection Ordinance and encouraged to maintain best management practices to reduce the discharge of pollutants and accidental spills from entering into the City's MS4
- ★ **Days Inn (4627 US Hwy 280)** Complaint from ADEM concerning hotel dumping paint and other

chemicals into a ditch that feeds into local waterway. Staff investigated and notified Owner of contractors disposing of paint and other chemicals into ditch. Owner was given a copy of Stormwater Protection Ordinance and advised of corrective actions needed prior to next inspection

- ★ **3250 Messer Airport Hwy** City Engineering staff informed Stormwater of possible continuous illicit discharge seeping from side slope at this location. IDDE staff investigated this area tracing manholes with no luck. Staff are continuously monitoring
- ★ **7712 4th Ave S (Hunter's Mobile Carwash)** Citizen called Stormwater staff with concerns of an illegal carwash with large amounts of runoff from property. Upon arrival, staff along with Zoning performed an inspection with no obvious sign of any wash runoff. Operator was given a copy of Stormwater Ordinance and encouraged to maintain wash runoff onsite
- ★ **St. Vincent's Hospital** Mayor's Office requested that Stormwater investigate a complaint regarding a pipe discharging water into a storm drain near this location. Upon further investigation, the pipe was determined to be a hydro guard that runs to prevent water stagnation for the BWB



- ★ **960 Pike Road** Last year's annual report, a citizen's complaint to the Mayor's office concerning an illegal carwash operation over the weekend prompted an investigation. Stormwater staff continued to monitor this location with no activity or signs of wash water runoff entering the City's MS4
- ★ **20th Street N & 6th Ave N** Stormwater staff received a citizen's complaint of a clear substance draining onto the sidewalk and into the street causing a discoloration to the sidewalk. Upon investigation, there was a discoloration to the sidewalk but no discharge. Staff will continue to monitor for future discharges
- ★ **540 2nd Avenue N** Public Works staff reported a strong odor coming from a ditch at this location. Upon investigation, staff observed a heavy presence of suds and large black garbage bags in ditch. Parameters were measured using the stormwater kit with no abnormal readings. Staff will continue to monitor
- ★ **Coleman Auto Repair** Staff received a request from Birmingham Fire Department to assist on an inspection of a complaint concerning an auto repair shop. Staff informed Owner/Operator of possible violations observed and corrective actions needed prior to next inspection
- ★ **2289 Morris Avenue (Birmingham Parking Authority)** Staff received complaint via ADEM concerning yellow Paint being dumped into a storm drain. Birmingham Parking Authority was informed of violations and advised of corrective actions needed to be taken
- ★ **On The Way Now** Stormwater staff received a citizen's complaint of a Company washing tar residue into the city's MS4. Staff spoke with the Owner/Operator and provided a copy of the Stormwater Ordinance
- ★ **Ensley Carwash & Detail** Weekend opportunistic inspection performed in conjunction with Zoning. At time of inspection, there was no activity but visible signs of wash water runoff entering the City's MS4. Staff spoke with Owner/Operator and provided a copy of Zoning/Stormwater Ordinance requiring connection to sanitary sewer system or ADEM NPDES permit
- ★ **Just Brothers** Weekend opportunistic inspection performed in conjunction with Zoning. Operator did not have a Business License. Property owner and Operator were given copies of the Zoning/Stormwater Ordinance requiring connection to sanitary



sewer system or ADEM NPDES permit

- ★ **Lifestyle Detail** Weekend opportunistic inspection performed in conjunction with Zoning. At time of inspection, there was no activity but visible signs of wash water runoff entering the City's MS4. Staff spoke with Owner/Operator and provided a copy of Zoning/Stormwater Ordinance requiring connection to sanitary sewer system or ADEM NPDES permit.

- ★ **Travis Chicago Style Burgers** Citizens complaint to the Mayor's Office concerning a neighbor washing the inside of his food truck in a residential area with runoff entering the City's MS4. Staff has partner with other Agencies and City Departments to address several violations concerning a mobile food truck

The process of the City's Stormwater Protection Ordinance (***Ordinance No. 14-198***) is to focus on preventing, locating, and correcting illicit discharges on Non-NPDES facilities while working alongside ADEM and the USEPA for NPDES permitted facilities. Any person receiving a NOV may appeal to the Appeal's Board within ten (10) days of receiving the violation to the City clerk's office. In the adoption of the Storm Water Protection Ordinance, the Council authorized a Storm Water Appeals Board as part of the enforcement process.

On August 1, 2017, Council adopted ***Ordinance No. 17-100*** (an amendment to ***Ordinance No. 14-198***) to reduce the number of members of the board from seven to five to further provide operation of the board. (***See IDD&E Appendix***) The Board provides a forum for a person notified of a stormwater violation to appeal a notice of violation. On June 19, 2018, ***Resolution No. 1384-18*** electing four (4) of five (5) members to the Stormwater Appeals Board was adopted by the Council of the City of Birmingham with said terms expiring July 1, 2020 and July 1, 2021.

During this year's reporting period, on September 17, 2019, ***Resolution No. 2176-19*** electing its fifth member to the Stormwater Appeals Board was adopted by the Council of the City of Birmingham with said term expiring July 1, 2021.

During the interim, the Board has met a total of 6 consecutive meetings.

MAPPING OF OUTFALLS:

Stormwater Management continues its ongoing efforts to update and maintain the data contained in the City's GIS system to map major outfalls in the City, however, there were no new outfalls identified during this year's reporting period.

PUBLIC NOTIFICATION MECHANISM (3-1-1):

The City has a complaint system to which citizens can make a phone call regarding stormwater related issues (See Table Below). The 3-1-1 call center serves as the liaison with the City departments by routing and tracking citizens' non-



emergency related requests and concerns for follow-up.

3-1-1 COMPLAINT SYSTEM	
<i>CATCH BASIN CLEANED</i>	<i>11</i>
<i>CATCH BASIN CLOGGED</i>	<i>33</i>
<i>CATCH BASIN REPAIRED</i>	<i>150</i>
<i>FLOODING</i>	<i>84</i>
<i>MISSING/BROKEN INLET</i>	<i>114</i>
<i>RESET INLETS</i>	<i>175</i>
<i>STORM SEWER CLEANED</i>	<i>522</i>
<i>STREET SWEEPING</i>	<i>392</i>

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certifications as qualified credentialed inspectors (QCI). Other Stormwater staff have also received erosion and sediment control training to provide cross-training and backup as may be needed.

During 2019, there have been **202 Land Disturbance Permits issued** by the City of Birmingham and **26 cases were closed. 1295 site inspections were conducted**, of which **319 were on qualifying sites. One hundred nineteen (119) site inspections failed**, and corrective actions taken by the

permittees to bring the site into compliance. All failed site inspections were given verbal warnings and all site were brought into compliance.

All Stormwater personnel routinely follow up on complaints through the City 311 complaint reporting system. This year nine (9) soil erosion citizen complaints were received. All sites were brought into compliance and the citizens notified.

A list of Projects and number of inspections following:

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2019 SEC INSPECTIONS-PROJECTS 1 ACRE OR GREATER

Project	Address	SEC #	Inspections
1	1503 50 th St. N.	2017-00201	21
2	101 London Pkwy	2017-00242	5
3	2200 Wenonah-Oxmoor Rd	2017-00247	19
4	320 Commons Dr.	2018-00006	22
5	100 Titusville Blvd	2017-00147	23
6	1009 11 th CRT W	2018-00111	Inactive- 18
7	7340 Cahaba Valley Rd	2018-00139	14
8	1905 Richard Arrington Jr Blvd. S	2018-00205	22
9	351 6 th St. S	2018-00208	8
10	1805 50 th St. N	2018-00284	22
11	2151 Lakeshore Pkwy	2018-00070	12
12	1110 7 th Ave N	2018-00026	Inactive - 1
13	151 Republic St	2018-00115	Inactive- 3
14	2301 Venice Rd.	2018-00170	10
15	2601 Inglenook Ln.	2018-00206	22
16	4801 Altamont Rd.	2018-00253	Inactive- 13
17	1101 Detroit St.	2018-00267	12
18	801 Titusville Blvd.	2019-00005	4
19	1326 Wilshire Dr.	2019-00004	3
20	1301 1 st Ave. S	2019-00009	5
21	1855 Dorroh Rd	2019-00026	14
22	322 Gadsden Hwy	2019-00029	10
23	1101 22 nd St. N	2019-00088	8
24	3145 Brook Highland Pkwy.	2019-00150	2
25	5955 Barber Motorsports Pkwy.	2019-00168	3
26	501 Republic St.	2019-00222	2
27	709 Dugan Ave.	2018-00249	21
1 AC OR GREATER ONLY		TOTAL INSPECTIONS	319

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LEFT BLANK ON PURPOSE

POST-CONSTRUCTION STORMWATER MANAGEMENT IN QUALIFYING NEW AND RE-DEVELOPMENT



It is a policy of the City of Birmingham to promote safe, secure and sustainable communities. State and City policy also provides for the prevention, abatement and control of new or existing water pollution (Alabama Code:22-22-2). Post-construction stormwater management refers to the activities that take place after construction occurs, and includes structural and non-structural controls including low impact development (LID) and green infrastructure (GI) practices, water quality and flood control practices to obtain permanent stormwater management over life of the property's use.

The Post-Construction Stormwater Design Manual, Maintenance Manual, Ordinance and stakeholder comments and City responses are available on the City Web Site at the following link:

<https://www.birminghamal.gov/storm-water-management/post-construction/>

The City of Birmingham City Council passed a new Stormwater Post Construction Ordinance in March of 2019 which became effective May 1, 2019. The Ordinance was passed to meet the requirements of the City of Birmingham's NPDES MS4 permit requirements and to provide flood and drainage standards. A Design Manual and Maintenance Manual were also completed and make part of the ordinance.

To meet the requirements of the MS4 Permit, the intent of the ordinance is to require that the post construction hydrology runoff mimic the pre-construction hydrology runoff for the 1.1-inch, and to encourage the use of low impact and green infrastructure (LID/GI) best management practices. In cases in which LID/GI practices are not used to meet the infiltration requirement, a Total Suspended Solids (TSS) removal standard of 80% is required. The standards are applied to sites 1 acre or greater of disturbed area with net increase in impervious surface.

To address the ongoing problem of stream bank erosion a small storm standard was provided. The standard requires that the 1-year storm event be detained and discharge over a 24-hour period.

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To ensure that downstream flooding is not exacerbated by stormwater detention facilities a watershed analysis requirement is included. The analysis is applied to watersheds in which the subject site is 10% of the area.

Flood control standards require that the post construction runoff does not exceed the pre-construction runoff for the 1 through 25 year storms. The 100-year storm event shall safely pass the system without damage.

A requirement for conceptual project meetings to ensure water quality if addressed in the design of projects was included, and a requirement for a recorded maintenance agreement was also included.



Post-Development Stormwater Ordinance:

The City retained the services of Wood Environmental and Infrastructure to develop a comprehensive post-construction Stormwater Ordinance, Birmingham Storm Water Design Manual, and a BMP Maintenance Manual. The Ordinance and

manual address both NPDES MS4 permit requirements and flood control and drainage needs.

The program included the development of the post-construction storm water ordinance and related policies, processes, and procedures with integration of watershed master planning and GI/LID program strategies. Development of post-construction storm water design criteria and specifications, focusing first on GI/LID, then on traditional storm water treatment methods, and including supporting design and plan submittal/site inspection tools. If GI/LID is not practical, then 80% TSS removal is required as the best measure practical.

The development has included an extensive stakeholder's involvement program including city staff, the development community, and the citizens of Birmingham and neighboring MS4 partners. The ordinance and manual was submitted to the City Council in February of 2019.

Post Construction Design Manual & Ordinance Training:

As of 2019, the City of Birmingham hosted training workshops for the purpose of familiarizing employees and developers with the new requirements of the Post-Construction Storm Water Ordinances that went into effect on February of 2019. This new ordinance will significantly impact the Land Development process in Birmingham.



The Topics included:

- ★ Overview of the Ordinances and their Development
- ★ Process for Administering the New Ordinances
- ★ Overview of the NEW Implementation and Design Manuals
- ★ Overview of the NEW Implementation and Maintenance Manual
- ★ Actions Necessary to Ensure Compliance

The Pre-Concept Sketch and Conference:

The *City of Birmingham Post Construction Storm Water Ordinance* requires the submittal of the pre-concept sketch and attendance at the pre-concept conference. This process does not require design calculations or analyses nor does it result in a plan approval. Rather, the process is used to characterize the hydrologic aspects of the property in its existing condition. The objectives of the process are to optimize the future on-site storm water system design and plan review process and identify opportunities for natural storm water management using LID. The intent of the process is to evaluate information about site hydrology (and potentially other environmental issues) in a collaborative way that can ultimately be beneficial to the overall project.

The applicant required to prepare a pre-concept sketch in accordance with the checklist provided in Appendix B of the *Post-*

Construction Stormwater Design Manual.

The checklist provides a complete inventory of the desired contents of the sketch. As many of the checklist elements as possible should be provided, based on the availability of data. Those elements that are not applicable to the project or not available must be indicated as such on the checklist. Proper use of the checklists will facilitate a more meaningful and efficient pre-concept conference.

Preparation of a pre-concept sketch includes the identification and location of features of the development that are important for effective storm water management. These features include, but are not limited to, land cover, hydrologic soil groups, streams, steep slopes, sinkholes, floodplains, bedrock, and existing on-site and adjacent manmade features or storm water systems, environmentally impaired waters and environmentally-sensitive areas (e.g., due to the presence of threatened or endangered species) will also be included.

The pre-concept sketch is required early in the site planning process, ideally before a site design is created for a future land development and definitely before clearing, grading, and construction begin. During the reporting year, the City has performed three Pre-Concept conferences and reviews, these conferences included Alabama Power New Vehicle Repair Garage, Grandview Student Housing, and the Burch Corporation Office and Warehouse.

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Structural Controls Installed & Inspected:

During the reporting year, the City has not installed or inspected any Post-Construction, public or private, structural controls.



Summary of Enforcement Actions:

No actions have been enforced during the reporting year.

SPILL PREVENTION AND RESPONSE

The primary purpose of this program is to prevent, contain, and respond to spill occurrences that have the potential to discharge into the City’s MS4. The City has implemented this program in compliance with the requirements of its National Pollutant Discharge Elimination System (NPDES) permit, including development of a hotline for reporting spills, identifying response staff roles and responsibilities and providing spill reporting information on the City’s Stormwater Management website. This document summarizes the City’s spill response for this reporting year.



SPILLS/HAZMAT INCIDENTS OBSERVED:

AGENCY	Number of Incidents
<i>Jefferson County EMA</i>	32
<i>Alabama Department of Environmental Management</i>	2
<i>City of Birmingham Stormwater</i>	6
<i>Birmingham Fire & Rescue (HazMat Related)</i>	727
<i>Birmingham Fire & Rescue (Stormwater Related)</i>	Available Upon Request

Spills are reported in various ways and because of such there is a need to document how various spill types are handled. In all

cases, the Birmingham Fire and Rescue Department (BFD) has primary responsibility for responding to spills that

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occur in City limits. The Birmingham Fire Department is dispatched to contain the spill in order to prevent any threats to human health and life. As necessary, the BFD coordinates its efforts with the Jefferson County Emergency Management Agency (JCEMA) as well as with pertinent City staff for both hazardous and non-hazardous spills. When spills that may directly or indirectly impact the receiving waters occur, the staff responsible for the management of the stormwater program is alerted to direct any and all necessary stormwater related field response work. When a spill is reported, the City staff will assess the situation with concern to the City's MS4 and receiving water pollution. The Fire Department prepares incident reports and those reports are forwarded to the JCEMA.

TRAINING PROGRAM ELEMENT:

The Birmingham Fire Department maintains a comprehensive program of ongoing training for HazMat team members. In order to maintain this level of training, HazMat team members are required to obtain training (along with drill exercises) that covers the following topics:

- ★ HazMat Readiness Drill/Deployment Exercise
- ★ HZ 16 HazMat Incident Commander
- ★ HZ 15 – How to Use The ERG

- ★ HZ 02 – HazMat Multi Company Training
- ★ HZ 03 – Hazardous Materials Technician
- ★ HZ 04 – Sampling/Collections Techniques
- ★ HZ 05 – Hazardous Materials Chemistry
- ★ HZ 06 – Decon Procedures
- ★ HZ 07 – Chemical of the Month – Ethanol
- ★ HZ 09 – Tanker Transport (Tanker Transport Safety)
- ★ HZ 10 – HazMat Apparatus Day
- ★ HZ 12 – Hydrogen Response
- ★ HZ13 – HazMat Equipment Familiarization
- ★ HZ14 – Air Monitor Calibration/Familiarization
- ★ IG_HM-01 – Materials Safety Data Sheets
- ★ IG_HM-03 – Hazardous Materials Identification-Info Resources
- ★ IG_HM-04 – Haz Mat Recognition
- ★ IG_HM-05 – Field Decon Procedures

During this year's reporting period a total of 81 HazMat team members (See Spill Prevention and Response Appendix) received weekly training using a computer-based software requiring login credentials and a number of training hours. Upon completion, each team member received a certificate of completion.

POLLUTION PREVENTION/ GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

In accordance with the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, issued on March 1, 2018, the City shall further develop or revise, implement, and maintain a program that will prevent or reduce the discharge of pollutants in storm water run-off from municipal operations to the MEP. The program shall include at a minimum, the following elements:

- ★ Inventory all municipal facilities having the potential to discharge pollutants via stormwater runoff.
- ★ Develop and implement a short and long-term strategy and program for the removal of trash from the waterways and tributaries in the permitted area in such a manner to quantify the removal of trash per year, which shall be included in the annual report and SWMPP.
- ★ Require certain measures to be implemented in the public ROW for any event or wherever it is anticipated that substantial quantities of trash or litter may be generated.
- ★ Ensure that trash receptacles or similar trash capturing devices are provided and maintained in areas

identified as high trash generated areas.

- ★ Provide standard operating procedures detailing good housekeeping practices to be employed at appropriate municipal facilities and during municipal operations that may include, but not limited to:
 - Equipment washing
 - Street sweeping
 - Municipal road maintenance
 - Chemical and waste storage and disposal
 - Vegetation control, cutting, removal, and disposal
 - Vehicle fleet/equipment maintenance and repair
 - External building maintenance
 - Materials storage facilities and yards
- ★ Program for inspecting municipal facilities to include municipal maintenance shops and equipment yards for good housekeeping practices, including BMPs. The program shall include checklists and procedures for correcting deficiencies.
- ★ A training program for municipality staff in good housekeeping practices.

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- ★ Assess water quality impacts for those flood management projects owned, operated or the responsibility of the City. Feasibility of retro-fitting existing structural control devised to provide additional pollutant removal from the stormwater shall be evaluated.

MUNICIPAL FACILITIES:

The City of Birmingham provides a wide range of services to its citizens by various City Departments and facilities located throughout the City. The City maintains approximately 125 facilities that consists of parks, ball fields and building grounds. A list of the City facilities is attached in **(Good Housekeeping Appendix)**.

Stormwater Management inspected 22 facilities during 2018-2019 reporting period.

Facility	Location	Dates
B'ham DOT Signal Shop	601 6 th Ave. South	10/22/2018
Birmingham DOT Office	603 6 th Ave. South	10/22/2018
Public Works Southside Division	6 th Ave. South	11/7/2018
City Hall City of Birmingham	710 20 th Street N.	1/24/2019
Birmingham DOT Sign Shop	603 6 th Ave. South	2/7/2019
Oxmoor Community Center	1992 Oxmoor Wenonah Rd.	2/28/2019
Botanical Gardens	2540 Lane Park Rd.	3/7/2019
Botanical Gardens Green House	2540 Lane Park Rd.	3/7/2019
Public Works North Birmingham	2413 27 th St. N.	3/21/2019
Public Works Eastern Division	301 96 th St. N.	4/1/2019
Public Work Horticulture Admin.	4721 Ave. W.	4/17/2019
Radio Shop	33 rd St. N.	4/22/2019
Public Works Service Facility	1029 33 rd St. N.	4/30/2019
PH&F Storage Trailer	Golden Flake Drive	5/8/2019
PH&F Storage Annex	Golden Flake Drive	5/8/2019
PH&F Truck Storage	525 6 th Ave. South	5/8/2019

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Police Academy	409 6 th Ave. South	9/23/2019
City Fitness Facility	400 6 th Ave. South	9/23/2019
Birmingham City Jail	401 6 th Ave. South	9/23/2019
North Police Precinct	2600 31 st Ave. N.	9/24/2019
Harriman Park Recreation Center	4347 W. L. Shuttlesworth Dr.	9/24/2019
East Pinson Valley Center	3000 Jefferson State Parkway	9/24/2019

STANDARD OPERATING PROCEDURES

The City of Birmingham has developed Standard Operating Procedures (SOPs) for various activities requires for implementing Pollution Prevention and Good Housekeeping Program. SOPs may include but not limited to the following:

- ★ Equipment washing
- ★ Street sweeping
- ★ Maintenance of municipal roads owned, operated, or under the responsibility of the Permittee
- ★ Storage and disposal of chemicals and waste materials
- ★ Vegetation control, cutting, removal, and disposal of cuttings
- ★ Vehicle fleets/equipment maintenance and repair
- ★ External Building maintenance
- ★ Materials storage facilities and storage yards (see ***Good Housekeeping Appendix***)

- ★ Facility SOP's are in place to prevent floatables (none to report for this permit year)

FACILITY INSPECTION PLAN AND PROCEDURE:

The City of Birmingham Stormwater Management has implemented a Municipal Facility inspection program for all City of Birmingham facilities. A Municipal Facility Inspection form has been developed and 125 facilities owned or operated by the City have been identified to this date. The inspection of all facilities within this permit period will continue by Stormwater Management staff, and employee training will be reviewed during facility inspections. These inspections include the identification of facilities that are more likely to have the potential to discharge into the watershed and storage of chemicals or operational procedures that could adversely impact surrounding water bodies or any particular watershed. Any inspected facility that has

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the potential to impact the surrounding watershed will be inspected on a more frequent basis. A list of City of Birmingham Facilities and a Municipal Facility Inspection form are found in ***(Good Housekeeping Appendix)***.

a) Qualified personnel shall conduct periodic routine facility inspections to determine the effectiveness of the Pollution Prevention Measures and Controls.

b) All City facilities inspections will be performed at least once throughout a permit cycle, if deficiencies are observed additional inspections may be performed.

c) An increased inspection schedule at Municipal facilities that perform operations more likely to create potential discharges into the MS4 will be conducted as necessary. Some examples include maintenance shops, equipment yards, and/or storage facilities will be inspected for good housekeeping practices including BMPs

d) The inspector shall document the findings of each routine facility inspections performed and the facility should be informed via verbal and/or electronic communication about any deficiencies.

e) The inspections must be documented through the use of a checklist that is developed to include each of the controls and measures that are evaluated.

f) When deficiencies are noted the operator of the facility will be notified, a case opened

and followed-up correspondence until corrected.



TRAINING PROGRAM ELEMENT:

The City of Birmingham Stormwater Management Program has developed a Quarterly Leadership Meeting with City staff that work with stormwater related issues, such as Department of Public Work, Park and Recreation, and Fire. The purpose of the meetings is to discuss recent or ongoing stormwater issues and collectively coming up with ideas to resolve stormwater issues and tailor them to fit each facility, department, or operation. Training is planned for four times a year and may include discussions of the following topics:

- ★ Stormwater Management Plan (SWMP)
- ★ Structural Controls
- ★ Good Housekeeping and Spill Prevention
- ★ Spill Control and Response

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- ★ Equipment washing
- ★ Street sweeping
- ★ Maintenance of municipal roads owned, operated, or under the responsibility of the Permittee
- ★ Storage and disposal of chemicals and waste materials
- ★ Vegetation control, cutting, removal, and disposal of cuttings
- ★ Vehicle fleets/equipment maintenance and repair
- ★ External Building maintenance
- ★ Materials storage facilities and storage yards

As part of the training program, City staff will review existing SOPs and are informed about any changes or updates to the SOPs. By participating in the training, City staff acknowledges that they have read and will implement SOPs.

A sign-in sheet shall be used to document City employees that have received training. All training material is available upon request.

CITY OF BIRMINGHAM FACILITY INSPECTIONS:


The City of Birmingham Stormwater Management has implemented a Municipal Facility inspection program for all City of Birmingham facilities. A Municipal Facility Inspection form has been developed and 125 facilities owned or operated by the City have been identified to this date. The inspection of all facilities within this permit period will continue by Stormwater Management staff, and employee training will be reviewed during facility inspections. These inspections include the identification of facilities that are more likely to have the potential to discharge into the watershed and storage of chemicals or operational procedures that could adversely impact surrounding water bodies or any particular watershed. Any inspected facility that has the potential to impact the surrounding watershed will be inspected on a more frequent basis. A list of City of Birmingham Facilities and a Municipal Facility Inspection form are found on the next pages. All inspection records are available upon request.

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		Municipal Facility Inspection Form	
Basin I.D:		Inspector:	Date:
		Responsible Party:	Date Delivered:
CRITERIA	SAT/UNSAT/NA	COMMENTS	
1. Are activity-specific BMPs in place?			
2. Are employees/contractors adhering to the minimum BMPs when possible?			
3. Is the facility reasonably clean and free of litter and debris?			
4. Is landscaped area irrigation contained within the landscape area?			
5. Are pesticides/herbicides/fertilizers minimized where feasible? Is storage of these materials adequate?			
6. Are stormwater drains stenciled?			
7. Are storm drains free and clear of debris? If cleaning is required, please note estimated weight and of material.			
8. Is area absent of any evidence of discharges, spills or leaks?			
9. Area storage and trash areas reasonably clean and uncluttered?			
10. Are garbage cans and bins kept covered emptied or maintained?			
11. Is the number and placement of trash bins sufficient for the facility?			
12. Are fueling areas clean and spill free?			
13. Is a stocked spill kit or dry spill method of cleanup at the fueling location?			
14. Are vehicle maintenance areas reasonably clean and maintenance activities contained in designated areas?			
15. Area bulk hazardous materials stored inside of secondary containment?			
16. Is water from surrounding areas prevented from reaching material storage areas?			
17. Are all BMPs installed and maintained properly?			
18. Are employees properly trained in preventative spill and cleanup techniques?			

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PHOTOGRAPHIC LOG		
Project: City of Birmingham MS4 Program Structural Controls Inspections:	Location: Creek	
<u>ADDITIONAL NOTES</u>		
<small>(If needed attach additional pages to properly document the inspection.)</small>		
RE-INSPECTION REQUIRED	YES	NO
Signature and Date of Person Completing the Inspection _____		
<u>All repairs to be completed within 30 days of notification.</u>		
Responsible Party:	NAME:	DATE:

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APPLICATION OF PESTICIDES, HERBICIDES, AND FERTILIZERS (PHF'S)

In accordance with the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, issued on March 1, 2018 the City is required to implement controls to reduce, to the MEP, the discharge of pollutants related to the storage and application of PHFs applied by employees or contractors, to public rights of way, parks, and other public property. The City shall implement programs to encourage the reduction of the discharge of pollutants related to application and distribution of PHFs. For those controls implemented, the City will obtain coverage and maintain compliance with ADEM NPDES Pesticide General Permit ALG870000, if applicable, or other applicable NPDES permits.

The City of Birmingham shall address priorities to include the following elements:

- ★ Identify all areas known to receive high applications of PHFs; develop a program to detect improper usage, and prioritize problem areas
- ★ Require evidence of proper certification and licensing of all applicators contracted to apply pesticides and/or herbicides on municipal property; require that applicators contracted to apply fertilizer are qualified in utilizing proper nutrient management

practices. Furthermore, applicator contracts are required to include a copy of this Stormwater Management Program Plan and all contractors are to be made aware of its provisions as a condition of contract acceptance and work at all designated City venues

- ★ Maintain an inventory of on-hand PHFs with information about the formulations of various products, including how to recognize the chemical constituents from the label, their respective uses, directions and precautions for applicators that explain if products should be diluted, mixed or only used alone, and, proper storage of products
- ★ Equipment use and maintenance
- ★ Training in safe use, storage and disposal of PHFs
- ★ Inspection and monitoring of facilities where PHFs are stored
- ★ Record keeping

The U.S. Environmental Protection Agency (EPA) regulates the sale, distribution and use of pesticides in the USA under the statutory framework of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to ensure that when used in conformance with FIFRA labeling directions, pesticides will not pose unreasonable risks to human health and the environment. When EPA approves a pesticide for a



particular use, the Agency imposes restrictions through labeling requirements governing such use. The restrictions are intended to ensure that the pesticide serves an intended purpose and avoids unreasonable adverse effect. It is illegal under Section 12(a)(2) (G) FIFRA to use a registered pesticide in a manner inconsistent with its labeling.¹

Application and use of pesticides, herbicides, and fertilizers are within the purview of the City of Birmingham Departments of Public Works and Parks and Recreation. The goal of the City's Pesticide, Herbicide, and Fertilizer Program is to:

- ★ Provide for safe public use surfaces throughout the City
- ★ Ensure compliance with all federal and state applicators laws and requirements
- ★ Ensure employees quarterly attend Core Leadership meetings and annually attend stormwater pollution prevention training
- ★ Employees performing the procedures in the standard operating

procedure manual should read and refer to the materials in the SWMPP

- ★ Use the least amount of product(s) necessary
- ★ Reduce or eliminate species resistance to the application of targeted products
- ★ Pesticide application must be done only under the supervision of a Certified Pesticide Applicator or qualified Supervisor.
- ★ All employees who handle or apply pesticides, herbicides or pesticides should be trained on the most recent Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS).

The discharge of pesticides (both Biological and Chemical) by the City of Birmingham is limited primarily to mosquito and other flying insect pest controls, weed and algae controls as described below. The City does not operate any treatment controls for animal pests or forest canopy pests in any general sense. All PHF documents are available upon request.

OILS, TOXICS, AND HOUSEHOLD HAZARDOUS WASTE CONTROL

PERMIT PART II B.9.

The City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System required in the City prohibit to the maximum extent practicable (MEP) the discharge or disposal of used motor vehicle fluids and household hazardous wastes into the MS4

OILS, TOXICS, & HOUSEHOLD HAZARDOUS WASTE CONTROL PROGRAM SUMMARY:

The U.S. Environmental Protection Agency considers some leftover household products that can catch fire, react, or explode under certain circumstances, or that are corrosive or toxic as household hazardous waste. Many common household products such as paints, cleaners, oils, batteries, and pesticides can contain hazardous ingredients and must be disposed of carefully. These products can become hazardous wastes when for some reason they no longer serve the useful purpose intended and the consumer decides to dispose of them. Some household hazardous wastes (HHW) can pose risks to people and the environment if not used, stored carefully, and disposed of properly. Accordingly, the City is required to complete the following activities under the terms of its NPDES MS4 Permit, including the following elements:

- ★ Make available material educating the public about used oil facility locations, hotline numbers, and alternatives to toxic materials
- ★ Provide acceptable alternate recycling or recovery options for HHW to the general public.
- ★ Advertise the location of used oil collection facilities
- ★ Provide employee training on spill prevention at all municipal facilities where oils or toxic materials are used

Included within the Stormwater Management Program Plan (SWMPP) are procedures being used by the City of Birmingham to develop, implement, and enforce a program for oils, toxics, and household hazardous waste controls. These are included in the educational information and employee training.

HHW programs can benefit communities in several important ways. They can reduce the risks to health and the environment resulting from improper storage and disposal of HHWs. The program can reduce a community's liability for the cleanup of contamination resulting from improper HHW disposal. Finally, HHW programs can increase community awareness of the potential risks associated with HHW and promote a better understanding of waste issues in general.

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Hazardous Household Waste Events:

Electronic take back at Adamsville Walmart and Center Point Courthouse:

Stormwater Management participated in two electronic take back recycling events for the citizens of the City of Birmingham and residents of Jefferson County. Along with the Jefferson County Stormwater Program. Stormwater Management collected computers, TVs, batteries, and other electronic devices at two locations on July 27, 2019 and again on August 10, 2019. The July 27 event collected 2794 lbs. of electronic equipment. The August 10th event collected 11506 lbs. of electronic equipment. Approximately 7.15 tons of material were recycled, preventing the materials from being disposed of in landfills. Other organizations participating included KBB, Alabama Environmental Council (AEC), Village Creek Society, and Protech Recycling. Metrics and information were collected from participants including types of items and information for the future planning of other HHW events.



Household Hazardous Waste Day event on April 20, 2019: Stormwater Management participated in a Household Hazardous Waste collection day on April 20, 2019. The Jefferson County Commission funded the collection event at two different locations in Fairfield and Irondale for residents of Jefferson County. This event accepted several household hazardous waste items including electronics, batteries, tires, prescription drugs, PHF's, paint, oil, grease, and white goods along with other items. A total of 135,097 lbs. or 67.5 tons of material was collected at this event.

Stormwater Management partnered with Jefferson County Stormwater Program, Jefferson County Department of Health, Jefferson County Commission, KBB, along with other organizations and commercial companies. If the Jefferson County Commission continues to fund this event, Stormwater Management hopes to participate on an annual basis.



Education and Training Program Element:

The City will from time to time will partner with other agencies to conduct HHW Day recycling and disposal events. The City has updated its website with a list of local businesses that conduct the recycling, reuse or collection of HHW materials. Information to the general public is also provided regarding the proper disposal of HHW products. Also, the City maintains and updates this content from time to time as new information related to the proper handling and disposal of hazardous household waste is discovered. In addition, the City has partnered with Jefferson County Environmental Services and added five locations within the city limits that accept used edible grease at recycling stations. Locations of Household Cooking Oil and Grease Recycling Centers can be found at Environmental Service's web-site www.jeffcoes.org and a link to this site will be provided on City of Birmingham Stormwater web-site. These Grease recycling stations provide empty edible grease containers that can be filled with grease and returned by the public to the stations. The City will from time to time will partner with other agencies to conduct HHW Day recycling and disposal events.

- ★ Continue to collaborate and develop new partnerships with partners that recycle and reuse various household waste products.

- ★ Identify and increase the number of household grease container collection sites within the City of Birmingham municipal limits. Identify surrounding collection sites convenient to City of Birmingham



residents. Provide this information to the public.

- ★ Develop a matrix of free disposal locations of HHW materials for the public and provide this information to the public.
 - Quantities of HHW and used oil collected will be tracked for the annual report
- ★ Develop a summary of all materials able to be recycled throughout existing Birmingham industries at no cost to the Public and advertise on



social media, the Stormwater Website and PIO.

- ★ Jefferson County Environmental Services educate Birmingham citizens on proper grease disposal
- ★ Continue Core Leadership training to all employees on the proper way to handle spills of oils, toxics and other Hazardous Waste. (Please see ***Pollution Prevention/Good House Keeping for Municipal Operations*** section of SWMPP)
 - Meetings will be recorded with dated attendance sheets and titles of presentations.

Cooking Grease Campaign: Jefferson County's Environmental Services Department (ESD) administers a county-wide household cooking oil and grease recycling program to reduce the amount of cooking oil that enters the sanitary sewer system, thereby reducing sewer overflows. This is a free service to all of the citizens of Jefferson County. Collection bins are located at several sites around the county with free plastic containers for residents to take home. Once a container is filled, it can be returned to the collection bin and exchanged for a clean container. The containers are collected weekly by the Grease Control Program inspectors and the oil is picked up at the Shades Valley Wastewater Treatment Plant by local rendering companies. Grease and oil accumulate in the sewer system and require diligent maintenance to prevent sanitary sewer overflows. ESD developed this program in the ongoing effort to the

prevent overflows and protect the water resources.

The bins were constructed by the County's General Services shop and are 4' wide by 4' tall and 2' deep and sit on legs 6" off the ground. The bins sit in a hard, durable plastic tray which provides a liquid retention barrier should a container leak or spill. There are currently 21 drop-off points that accept filled containers for recycling. There was also a temporary grease collection site at Birmingham's Legion Field during large sporting events for grease collection from tailgaters.

A total of 3,777 gallons was collected between October 1, 2018, and September 30, 2019 in Jefferson County. In the City limits of Birmingham 5 sites collected 782 gallons. The County's Environmental Services Department (ESD) distributed 6,550 flyers within apartment complexes, and provided bilingual program materials that were both displayed throughout the complexes and distributed to residents. In addition, a form letter which can be sent to the residents as a reminder of the cooking Oil and Grease Recycling Program was made available to the apartment complex management. Along with this, Jefferson County Environmental Services presented 10-12 educational events to promote the Oil and Grease Recycling Program. The City Stormwater Program staff continues to promote this program and distributes



materials, containers and scrapers at various events.

Conclusion:

Household Hazardous Waste can be removed from the waste stream for the City of Birmingham, if efforts from Stormwater Management and its partners can give residents alternative methods of disposal through recycling or reusing these materials.

Increasing opportunities for residents to take ownership in their community and by providing more convenient locations for these disposal sites, allow the City of Birmingham to reduce the handling of HHW and reduce the need for expensive solutions such as HHW disposal events.

Eventually, the City of Birmingham, with leadership from Stormwater Management, hopes to reduce HHW levels to near zero through partnerships, education, and alternate opportunities for disposal.

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INDUSTRIAL STORM WATER RUNOFF



The City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) requires that the City implement a program to inspect, monitor and control pollutants in storm water runoff to the MS4 from municipal waste landfills, hazardous waste treatment, storage, disposal and recovery facilities, and industrial facilities and high-risk commercial facilities. Facilities to be addressed under this program include facilities that have reported under the requirements of the Emergency Planning and Community Right to Know Act (EPCRA) Title III, Section 313 and any other industrial or commercial discharge that the City determines is contributing substantial pollutants loading to the MS4 ("high risk facilities").

INDUSTRIAL STORM WATER RUNOFF PROGRAM SUMMARY

Industrial & High Risk Facility/Runoff Inspections & Enforcement Actions

(Available Upon Request)

<i>Tier II Reporting Facilities</i>	69
<i>Tier II Pre-Incident Plans</i>	32
<i>PIP Inspections</i>	1179
<i>HazMat/Industrial Inspections</i>	59
<i>Haz/Mat/Industrial Inspection Rechecks</i>	59
<i>Enforcements</i>	1
<i>Corrective Actions</i>	1



The City's Industrial and High Risk Runoff Program, per the requirements of the NPDES Permit, identifies industries and high risk runoff facilities within the City political boundaries not already subject to State NPDES regulations and State NPDES regulations with appropriate Standard Industrial Classification (SIC) or the North

American Industry Classification System (NAICS) codes. The City is currently inspecting selected industrial sites for stormwater pollution. These have been isolated as needed to illicit discharge inspection efforts by the IDD&E inspection team

WATER QUALITY MONITORING AND REPORTING

Highlights:

This reporting year represents the sixth full year of monitoring water quality using the new water quality monitoring strategy that was implemented by Stormwater Management on November 20, 2013. That water quality monitoring strategy was intended to identify existing pollution sources, the variability of the pollutant or pollutants being discharged into waters of the state, and where appropriate, the effect of effluent on receiving waters that may have an opportunity to cause there to be an exceedance of a narrative or numerical water quality standard as defined in Alabama code. The location of the City's monitoring stations in each watershed, both instream and screening sites, outfall locations, and the certified data collected to date since ADEM approved the new water quality monitoring strategy is provided with this report in ***(Water Quality Appendix)***. During this period several overarching activities have dominated Stormwater Management's water quality monitoring program, including:

- ★ During this reporting period, Stormwater Management contracted with Birmingham Water Works Board (BWVB) EnviroLab to continue to provide analytical services.
- ★ It was determined that BWVB lab reports for Zinc levels were incorrect

for the previous two-year period due to laboratory data analysis issues. This was discovered by Stormwater Personnel in May 2019 while reviewing data and was addressed with EnviroLab. Correct zinc numbers were provided to Stormwater Management and the correct values were entered and used moving forward. ADEM was notified of the data corrections and new data was provided to ADEM Water Quality Group for analysis.

- ★ USGS stream gaging stations have been installed in Village Creek and Valley Creek, which include variable combinations of stream elevation discharge water quality and rainfall. These stations can be found on the USGS Website as:

- ✓ Station 02458148; Village Creek @ 86th Street
- ✓ Station 02458502; Village Creek Near Pratt City
- ✓ Station 02458190; Village Creek @ 50th Street
- ✓ Station 02458350; Village Creek @ 24th Street
- ✓ Station 02458450; Village Creek @ Avenue W, Ensley
- ✓ Station 02461130; Valley Creek @ Center Street
- ✓ Station 02461192; Valley Creek @ Avenue W, Ensley

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- ✓ Station 02423571, Shades Creek @ Elder Street Bridge
- ★ Field reconnaissance of the Valley Creek outfall during this period at VC0.1s was conducted with the help of Jefferson County Environmental Services. IDDE evaluation and mapping continues (*see Major Findings* section)
- ★ Cotton Mill Branch on Village Creek at VIC07.0s. screening site is being continuously monitored. The headwater is located at Avondale Lake. Stormwater Management suspects this location as the source of elevated TSS readings based on dry weather screening at that instream peaking location within the receiving stream segment. This site will continue to be monitored into the future.
- ★ 2018-2019 *Summary of Unpermitted Discharges* report prepared by Jefferson County Environmental Services for Birmingham (***Water Quality Appendix***), approximately 2.3 million gallons of sanitary waste was discharged into Birmingham creeks and streams. Compared to last year's (2017-2018) 1.1 million gallons discharged into all watersheds within the City of Birmingham. The City continues to work with Jefferson County Environmental Services to address sanitary sewer overflows when discovered.

Finally, for purposes of reporting water quality data in this year's report, a longer period than what is required annually by the permit is included to provide a better understanding of trends and water quality developments being observed. A decision has been made by Stormwater Management to average the previous year's data and compare it to the current permit year's data for individual streams, as has been done before. Therefore, whenever possible, a longer period of water quality analysis is provided along with water quality data observed during this reporting year. Overarching data review and reporting will be done for all streams, excluding screening sites, for all dates.

The City of Birmingham is located in the lower Appalachian Mountains in Jefferson County in central Alabama. Its corporate limits are bisected by the Appalachian Plateau (Cumberland Plateau) and the Valley and Ridge geophysical regions. The Valley and Ridge province in this area is characterized by limestone valleys and resistant sandstone ridges that run parallel from northeast to southwest. Birmingham is located in Jones Valley, which is dominated by limestone derived carboniferous soils and karst topography having numerous natural springs. Village Creek, as well as other creeks and tributaries, originate from naturally occurring springs. Village Creek originates in the Roebuck area of Birmingham. The western part of Birmingham is partially located in the Appalachian Plateau and is characterized by

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hard sandstone shale and limestone at depth.

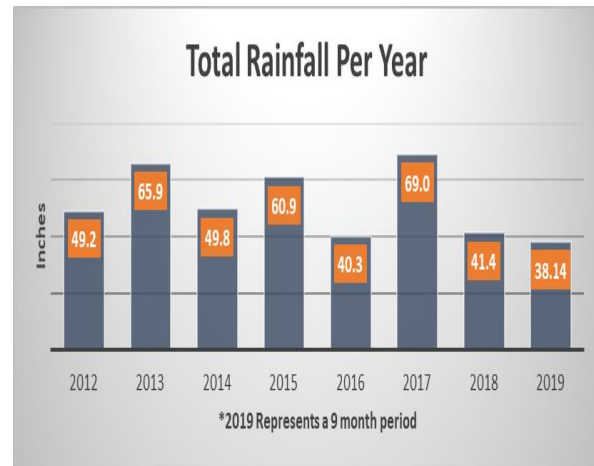
Soils in the Valley and Village Creek drainage basins in Jones Valley are in large part associated with limestone derived soils. Many of these carbonate soils have higher percentages of chert such as Bodine and Fullerton type soils (See USDA, NRCS. Web Soil Survey). The carbonate soils of this type have a higher percentage of chert and the soils lack structure and are not very well consolidated. Erodible soils such as these wash more readily during a rain event and are more difficult for vegetation to become established on hard siliceous cherty soils.

On slopes, these soils wash down into the tributaries, drainage-ways and creeks to deposit silt and chert into the MS4 and on, into the creeks. See the picture below of Village Creek at VIC01.6s (Roebuck Golf Course) for examples of the sedimentation



occurring as a result of erosive velocities in association with rainfall.

Even though carbonate soils of this nature can be found throughout the Greater Birmingham area they are more prevalent in the eastern part of Birmingham.



Rainfall:

The chart above shows rainfall ranged between an annual low of 38.14" in 2019 to a high of 69.0" in 2017. The average annual rainfall during the 8-year period was 51.8" with 2019 data only representing a 9-month period. Two of the past four, 2016 and the most recent 2019, have represented periods of drought conditions. In contrast 2017 and 2018 no drought period was evident. Periods of heavy rainfall were observed during 2017 and early 2018. During 2019, the first quarter of the year represented higher rainfall amounts with rainfall almost equaling 2018 yearly totals. The latter half of the 2019 sampling period very little rainfall was recorded during the months of June, July, August and September.

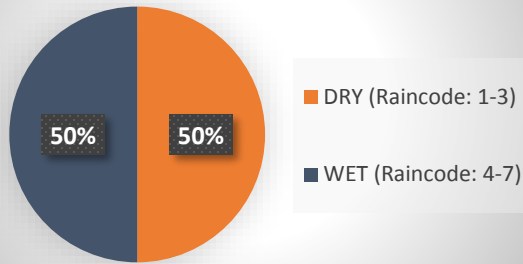
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2018-19 Wet VS Dry Sampling



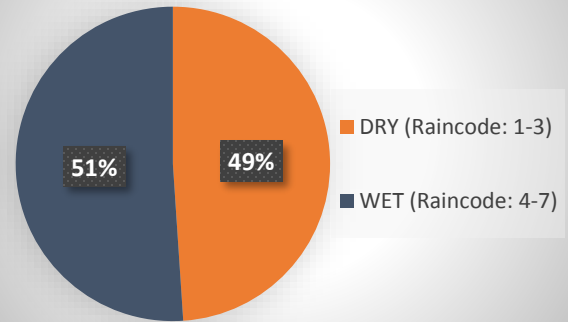
During this reporting period (2018-2019) the total rainfall was 55.08", with the highest rainfall being during the month of December 2018 at 10.47". However, as it is depicted in the above cart sampling occurred during wet periods 50% of the reporting year.

Recalling the *City of Birmingham Water Quality Monitoring Strategy for Alabama Department of Environmental Management (October 4, 2013; Pg. 14)* the sampling focus was intended to be during periods of dry weather flow, especially where stream segments had known impairments and outfalls greater than 36". For the purpose of water quality monitoring by the Stormwater Management instream team, dry weather reporting is represented as less than 0.10" of rainfall preceded by 72 hours of antecedent dry conditions. All other rainfall conditions greater than 0.10" by definition are considered wet. Classifying: rain codes: 1-3(dry) and 4-7 (wet). This rain code is also

described on our field sheet within the SWMPP.

By contrast rainfall during the entire 6-year study period represented almost equal sampling between wet and dry conditions trending one-percentage point towards wet. Please see the following pie chart for complete sampling period percentage results from 2013-2019.

2013-2019 Wet VS Dry Sampling



Flow:

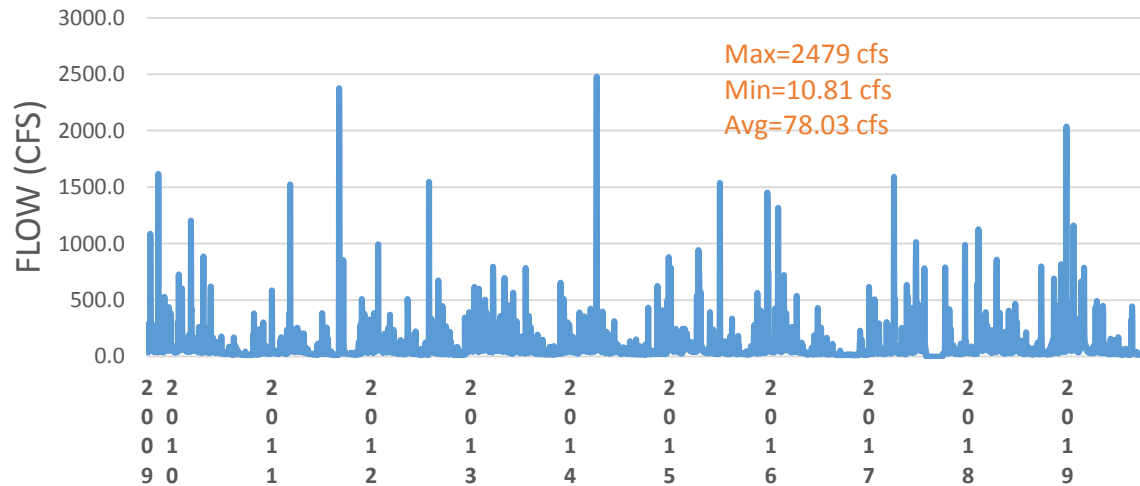
The Alabama Department of Environmental Management, Water Quality Branch, published in 2005 its Final Total Maximum Daily Loads (TMDL) for Village Creekⁱ. That document reported Maximum Daily average flows at Avenue "W" to be 3,040 cfs. Minimum daily flows were 9.3 cfs and average daily flows were 79.2 cfs. These measurements were taken during the period between 1988 and 2001.

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Year (2019 represents 9 months)

Please note the figure above. During the period between 2012 and 2019 daily average flow measurements reported by the USGS at Avenue W", Ensley were strikingly similar to the daily average flow data earlier reported by ADEM. Referencing the figure above from data provided by the USGS for the same location, maximum daily flows averaged 2,479 cfs. Minimum flows were

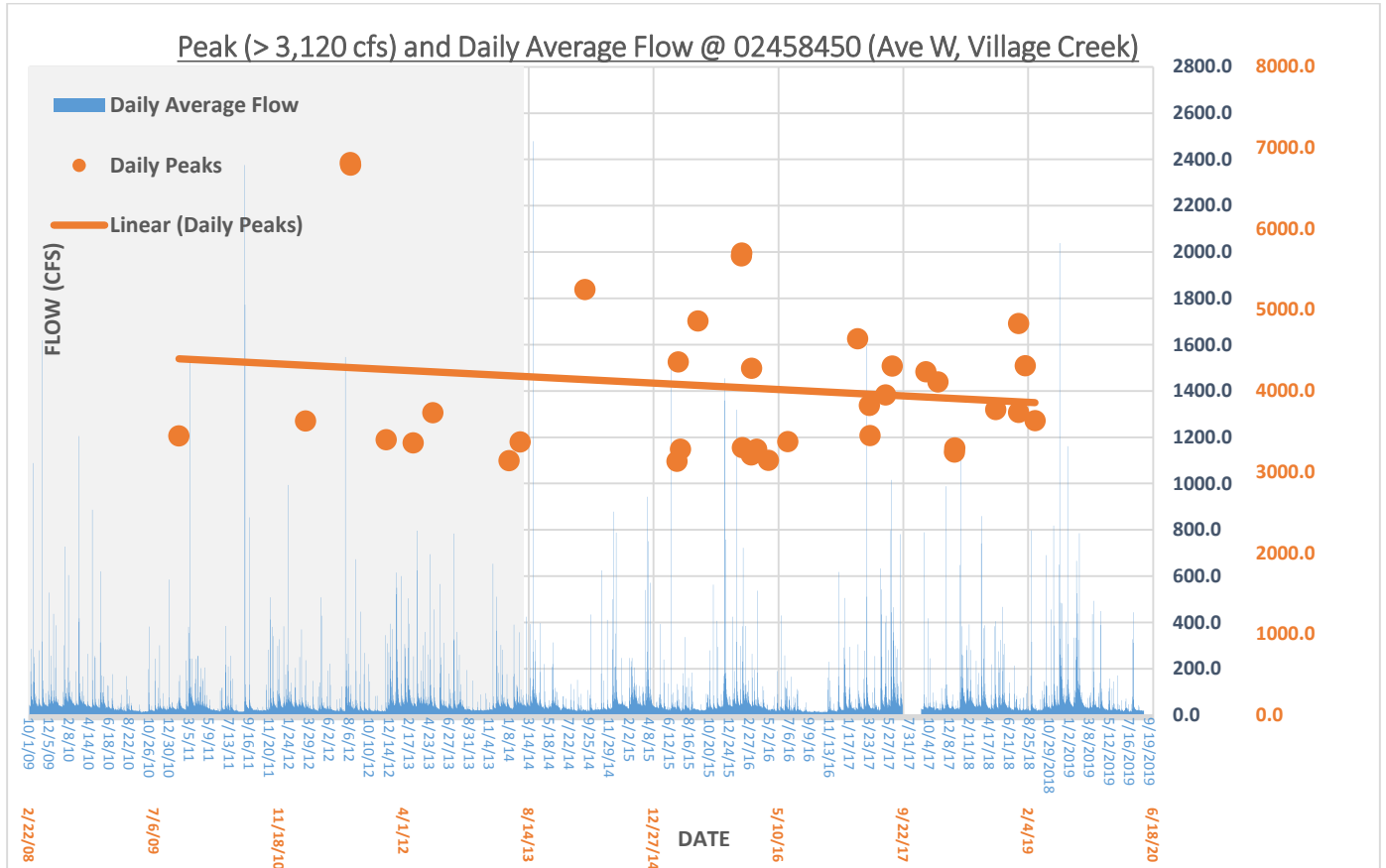
10.81 cfs and the average daily flow measurement was 78.03 cfs. The minimum daily average flow of 10.8 cfs occurred on October 4, 2010 and the maximum flow of 2,479 cfs occurred on April 8, 2014. As can be seen, Village Creek flows continue to be mostly consistent with other observations by ADEM and by the USGS.

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Depicted in the chart above is daily average flow data provided by the USGS at gage #02458450 – Village Creek @ Avenue W, Ensley. The flow record begins approximately on October 1, 2009 and ends on September 30, 2019. Included on this chart in Orange Points are peak flows greater than 3,120 cfs, which in reference to the TMDL for siltation (ADEM, 2005) represents the 9-year period for peak discharge.ⁱⁱ All recurrent flow events that exceeded a peak discharge of 3,120 cfs are also included in the chart above along with its associated trend line. The downward

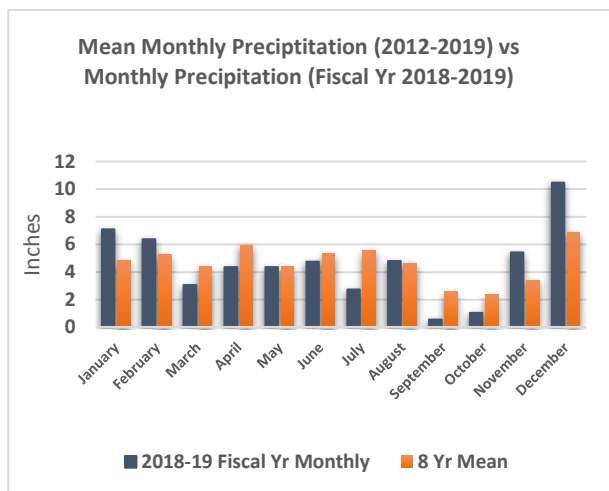
trend line depicts a reduction in extreme flows during the period 2010-2019. This reduction in the peak flows during this study period is in response to the rainfall conditions throughout recent years. This reduction in flow is created by frequent but less intense rainfall events. The mean monthly precipitation (2012-19) verses monthly precipitation (fiscal year 2018-19) the following chart depicts relatively minor change in inches throughout the years. However, there is some variability per month.

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Water Quality:

Data collection methods used during this study for water quality were based on the approved 2013 Water Quality Monitoring Strategy. Surface-Water samples have been collected since 2013 bimonthly (i.e. 2-month intervals) at water quality monitoring stations described earlier. See **(Water Quality Appendix)**, VIC07.0s (Cotton Mill Branch) continues to be monitored bimonthly due to instream peaking conditions observed at VIC07.0 and VIC08.1 during periods of dry weather screening. All water quality stations conform to a nomenclature requirement with screening sites adding an "s" to the mileage destination with upstream being the smallest number and downstream being the largest. Each surface-water grab sample was measured in the field by either a Hydrolab® or YSI Multimeter, which measured: Temperature, pH, Dissolved Oxygen and Percent Dissolved Oxygen, Barometric pressure, conductivity, ORP, and TDS (Hydrolab® only). All other

Water Quality parameters were measured by Envirolab at the Birmingham Water Works Board or other field devices (e.g. Oakton T100 turbidity meter, Stormwater Test Kit, and test strips) **see Water Quality SOP for more detailed information.**

This section also includes data analysis and review for water quality found in Results and Discussion. Specific methods used to interpret the data include graphical tools and statistical methods. Graphical tools include bar, scatter, and line charts, which depict the total analytical period of history since 2013 and the most recent data period (i.e. 2018-2019) in contrast. Bar-whisker plots are used to display the variability of select constituents over time. Included on each bar-whisker plot is a median line, X indicates the mean, the 1st and 3rd quartile data range, and a maximum and minimum reasonable value. Reasonable values are generally accepted as the statistical 50% of the data set when the 3rd quartile is subtracted from the 1st quartile and the difference is multiplied by 1.5 to establish the upper and lower reasonable value fences for considered stream constituents. The data includes both instream and ORI data collected during the study. This data does not include outlier data beyond the statistical data fence boundaries. The data also does not reflect discrete flow or rainfall conditions.

The chemistry of surface waters is based on the interactions between rainfalls, groundwater, rock and soil conditions within each watershed. For the most part concentrations are reported in mg/L.

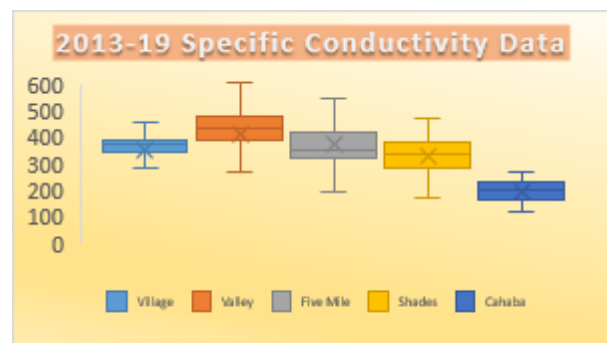


Stream water chemistry varies with flow and rainfall conditions, which can vary in each watershed and under differing stream flow conditions. Stream water base flow is predominately from ground water flows and active industrial process during low flow periods. During and after a storm event stream water is a mixture of rain water and nonpoint source surface runoff, shallow subsurface flow, industrial discharge water, and groundwater discharge. Precipitation tends to dilute the major ion composition while human activity can further alter a streams water chemistry, including elevated levels above background.

Results and Discussion:

The certified data record of Birmingham's Monitoring program is included in **(Water Quality Appendix)**. This section will describe the overarching water quality in all City watersheds, followed by individual creek analysis.

During the more than six-year study the City of Birmingham Stormwater Management Section has relied upon specific conductivity as a measure of stream variability and potential sources for impact.



The figure depicts individual stream variability, which includes the maximum reasonable value, median, mean, minimum reasonable value, and the 1st and 3rd quartile data. The overall specific conductivity mean concentration for all five creeks is within the range of 200 to 600 ($\mu\text{S}/\text{cm}$), with the Cahaba River having lower specific conductivity than the other four creeks. Valley Creek appeared to have the greatest mean concentration. Village Creek appeared to have the least data variability among all City watersheds.

Based on the figure below, the overall specific conductivity dataset demonstrated an inverse correlation, having R^2 value of 0.2003. The data included here represents flow collected at USGS 02458502. and specific conductivity throughout the watershed. The water quality data includes only the instream water quality Conductivity data at VIC14.0 during the six-years since 2013.

Dry period is represented as rain codes: 1-3 and wet period is represented as rain codes: 4-7. During the 6-year data set, the highest conductivity at VIC14.0 records: 449.6 $\mu\text{S}/\text{cm}$ during wet periods, and 458.7 $\mu\text{S}/\text{cm}$. during the dry periods.

The maximum conductivity recorded during the dry period was 458.7 $\mu\text{S}/\text{cm}$, which was only approximately 9.1 $\mu\text{S}/\text{cm}$ higher than the maximum specific conductivity measured during the wet period (449.6 $\mu\text{S}/\text{cm}$).

Therefore, and based on the period of record since 2013, instream specific conductivity at

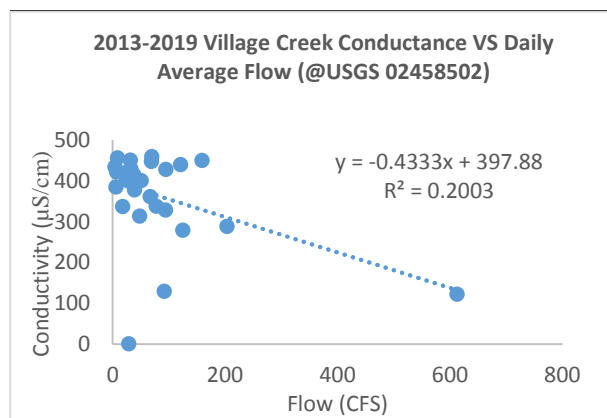
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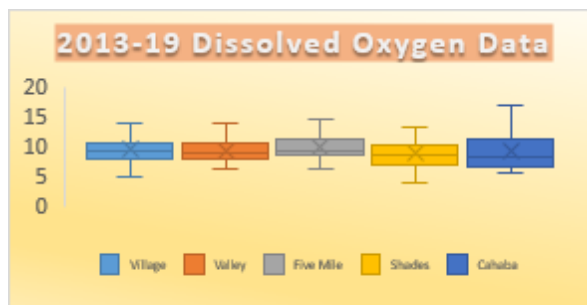
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Village Creek appears stable and only slightly lower as flow conditions increase due largely to rainfall conditions. Therefore, inflow deviations from the instream condition should be considered as an illicit discharge when concentrations of specific conductivity in the illicit discharge are increased or decreased beyond background levels in each creek.



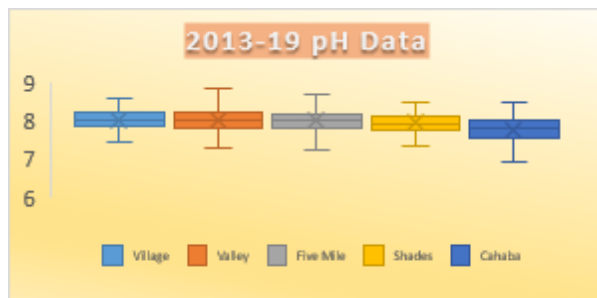
The following bar-whisker graphs represent field parameter conditions for each watershed within the City of Birmingham box plot represents the median of each box plot while the “x” represents the mean. This figure documents that the Dissolved Oxygen concentrations for each watershed tended to be elevated. With the exception of the Cahaba River, the difference between the 1st and 3rd quartile appeared similar and tightly grouped around the median, whereas the Cahaba River demonstrated a greater variability.



All dissolved oxygen samples tested within acceptable levels.

For the six-year study, as will be discussed later in the anti-degradation section, all Creeks within the City of Birmingham had pH concentrations that did at some point exceed the state standard of 8.5 units.

The only acceptance to this was at the Cahaba River, where pH reading taken by the Stormwater Management did not exceed the 8.5 pH standard.



However, this year's data did not exceed the state standard of 8.5 pH units, except during an extreme rain event on 2/12/2019 at VC0.7 where a pH reading of 9.3 units was recorded. The sampling event on 2/12/2019, which resulted in a high pH coincided with a flash rain event resulting in a flushing of the watershed while the sample was collected. All other pH readings before

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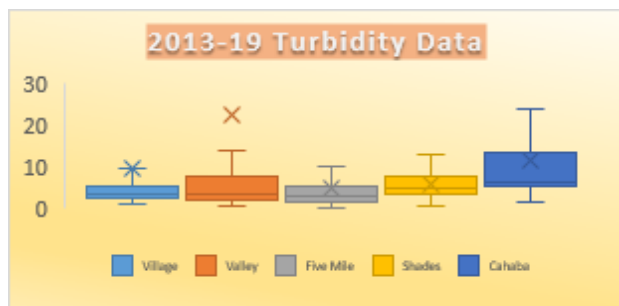


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and after the rain event were within acceptable ranges.

In general, the pH concentrations tend to be higher in the area watersheds because of higher concentrations of calcium carbonate associated with karst topography in the Birmingham region. But, overall the pH levels within Birmingham throughout the years have been within state limits, with a few exceptions.

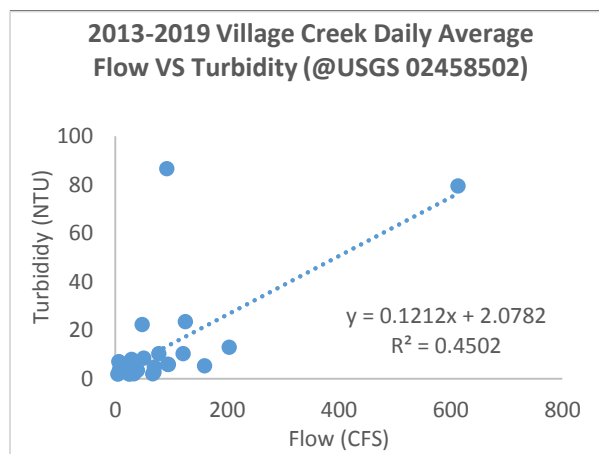


Consistently through this sampling period mean concentrations of Turbidity (NTU) exceeded median concentrations and in 2 cases, even exceeded the third quartile. In the case of Valley Creek, the mean concentration even exceeded the maximum reasonable value fence, which indicates a considerable number of turbidity values exceeded the statistical 50% of the data. The values in Valley Creek that exceed the 50% can be attributed to two factors that were discussed in the summary at the beginning of this report, an illicit discharge and heavy storm events.

Village Creek also exhibits the same trend that can be attributed to heavy storm events during sample collection.

The next chart reflects mean daily flow obtained from the USGS at dates concurrent with stream sampling dates in Village Creek. Turbidity data is measured in the field with an Oakton Turbidity Meter. The period of record shown above represents 31 data points. Most of the Turbidity data fell within a range bounded by < 100 cfs flow and < 10 NTU turbidity.

The associated Turbidity chart below depicts a strong correlation between flow and turbidity levels. During high flow Turbidity levels increased and during low flow turbidity levels decreased. Noting that $R^2 = 0.4502$ would suggest a strong correlation between turbidity and flow.



The Birmingham Water Works Board (BWVB), Envirolab reports high E. coli concentrations as >2,419.6 mpn/100ml under the current analytical methodology. The reader is reminded that high values greater than the maximum reasonable fence are not shown on this chart when E. coli

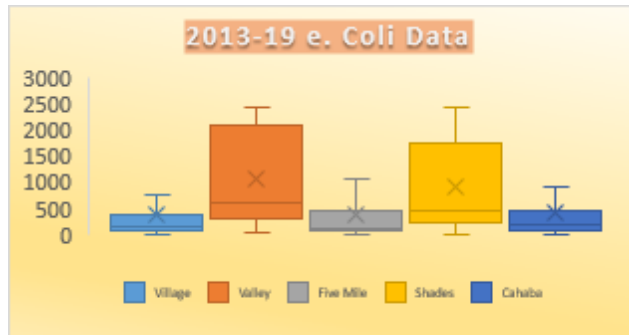
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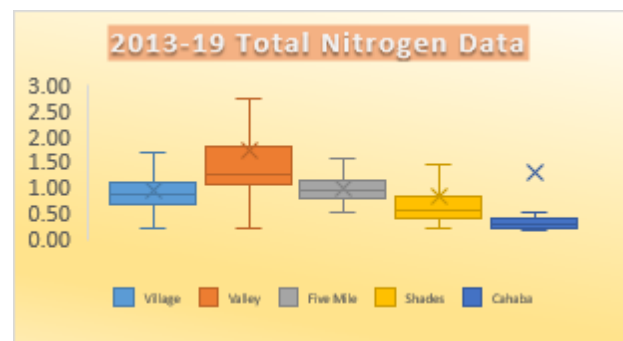
values exceeded the statistical 50% of the data.



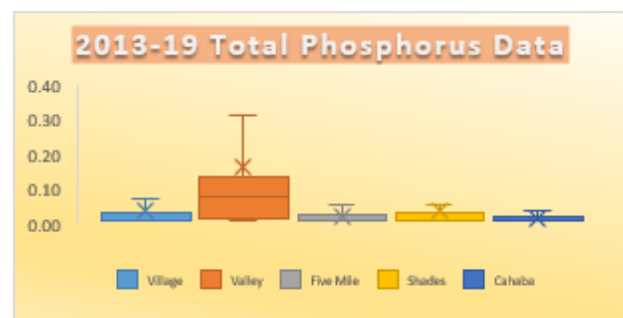
Overall E. coli data shows a greater range of values and high concentrations in Valley and Shades Creeks than the lowest in Village Creek and Cahaba River. The average mean concentrations for each stream are reported as greater than the median concentration suggesting that each stream has generally high E. coli concentrations. The higher concentrations of E. coli in Valley and Shades Creeks may be attributed to the outside influences such as sanitary sewer leaks. Jefferson County Environmental Services indicated that approximately 682,747 gallons of sewage was discharged into Valley Creek during 2017-2018, and 1,452,215 gallons during 2018-2019. This number more than doubled during the current year. Shades Creek also had 490,352 gallons of untreated sewage, which is also double the amount of untreated sewage reported last year.

The reader is reminded that Total Nitrogen includes both inorganic and organic constituents. Inorganic Nitrogen is the sum of Ammonia, Nitrite, and Nitrate concentrations. Organic Nitrogen is the

difference between Total Nitrogen and Ammonia concentrations. The figures below, it appears that all watershed streams throughout Birmingham can be considered largely inorganic.



Valley Creek has the greatest Total Nitrogen variability, while the Cahaba not only has the least variability but also has the lowest Total Nitrogen concentrations. Sanitary sewer discharges in areas around Valley Creek from 2018-2019 could explain some elevated Nitrogen levels compared to other watersheds. This may also explain increased phosphorus levels for data collected from 2013-2019 indicated on the Phosphorus Data bar-whisker chart. This issue is being evaluated as an IDDE issue.



With respect to Total Phosphorus in Valley Creek, the figure above demonstrates the

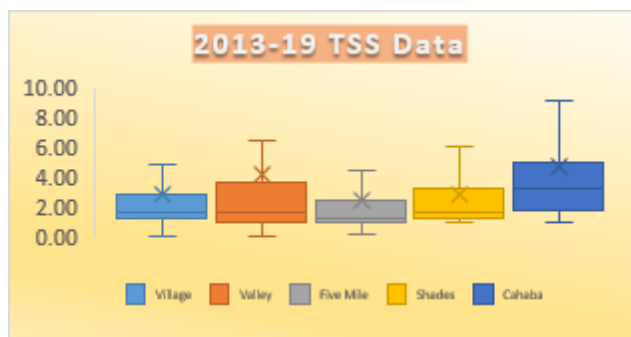
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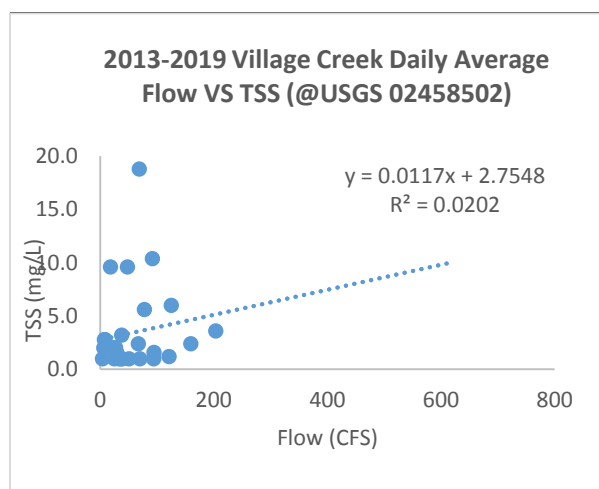
greatest variability and highest concentrations reported. The data displays Total Phosphorus of Village, Shades, Five Mile, and the Cahaba River, as a low variability; of all watershed streams in Birmingham. Total Phosphorus average concentration was less than the mean, suggesting either many low phosphorus concentrations or very few high concentrations, but sufficient enough to increase the median phosphorus concentrations.



The figure above documents Total Suspended Solid concentrations (TSS) (mg/L) for all streams in Birmingham. Interestingly, the Cahaba River shows the highest reasonable value fence. It is particularly notable that the TSS concentration at the upper end of the reasonable value fence was still < 10.0 mg/L with all City streams having low TSS levels.

During very infrequent rain events as velocity increases turbidity and TSS increases respectively, as seen in field observations and sampling records. This is not only demonstrated in the Turbidity scattered chart; but also demonstrated in the TSS scattered chart. Noting that R^2

=0.0202 would suggest a strong correlation between TSS and flow.



Village Creek:

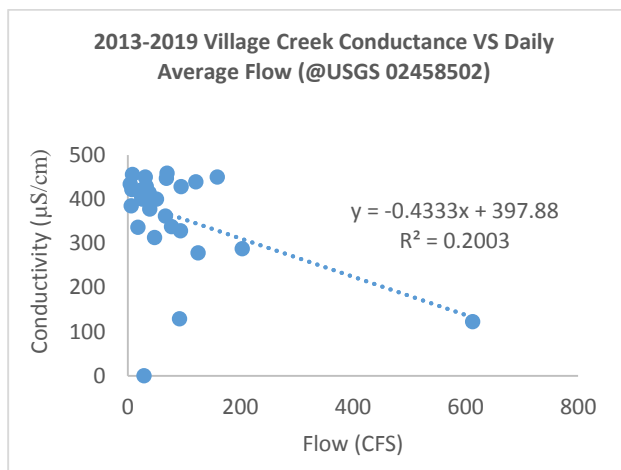
This reporting period now provides the opportunity to consider six-full years of water quality monitoring in Birmingham's creeks, starting specifically in Village Creek. The foundation of the City's instream water quality monitoring program has been to identify instream peak concentrations of specific conductivity that would lead one to conclude that at least in that flowing stream segment(s) there is an influence from another dissimilar water source, whether from an incoming tributary, an outfall discharge, or from a groundwater seepage influence. The reason for that continues to be foundational to the program since flow and specific conductance are inversely correlated, although weakly so, as evident by the figure following (R^2 value of 0.2003).

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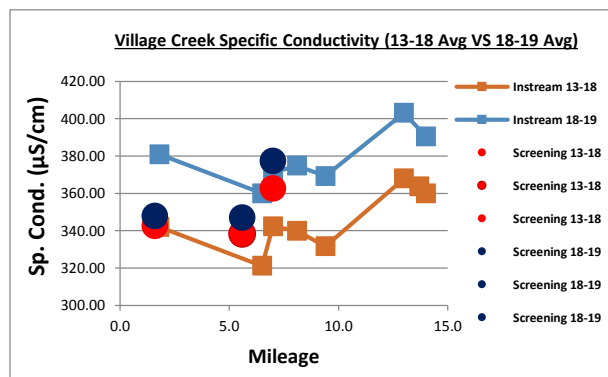


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During this six-year period, specific conductivity has consistently averaged 348.9 $\mu\text{S/cm}$. The highest specific conductance recorded to date was 458.7 $\mu\text{S/cm}$ and was recorded on December 12, 2018 at station VIC14.0 during a moderately high rainfall period. Average annual rainfall between November-2013 and September-2019, inclusive was 51.8". By comparison, during this study period (2018-2019), average annual rainfall was 55.08".

Specific Conductivity during the current period of this study had a low of 260.9 $\mu\text{S/cm}$ on February 13, 2019 at VIC06.5. The highest Specific Conductivity during the same reporting year was 458.7 $\mu\text{S/cm}$ recorded on December 12, 2018 at VIC14.0. During normal rain event last year's report appeared as though lower Specific Conductivity indicated, "A measure of diluted major ion composition as a result of significant rainfall."



However, further evaluation of rainfall vs Specific Conductivity may indicate that sampling during the onset of a heavy rainfall event appears to increase Conductivity as the initial first flush is adding material to the stream as samples were collected. As the rainfall event continues the rainfall begins to dilute the stream and Conductivity begins to decrease as dilution of the stream occurs.

During this reporting period, Specific Conductivity was essentially the same as has been since monitoring in accordance with the new methods begun in 2013. However, with a slight increase of approximately 40 $\mu\text{S/cm}$ overall for this year's conductance in relationship to past average combined (2013-2018). This is consistent for each in stream station along Village Creek from the headwaters to the downstream most station in the City of Birmingham reflecting a mirror like approximation. That same trend was also similar for all three screening sites in the first six miles of stream inflows.

VIC07.0s will continue to be included as a monitoring site. These sites are particularly important for data collection for all parameters including zinc, as this sub-basin

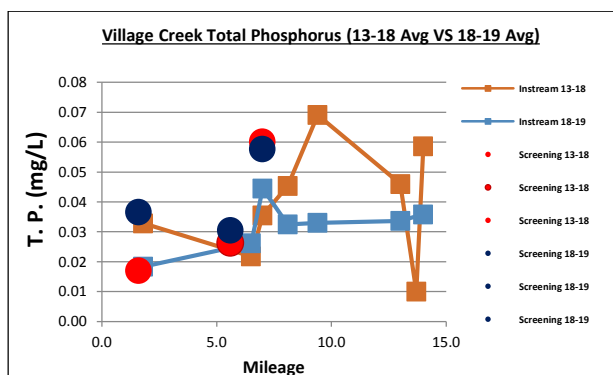
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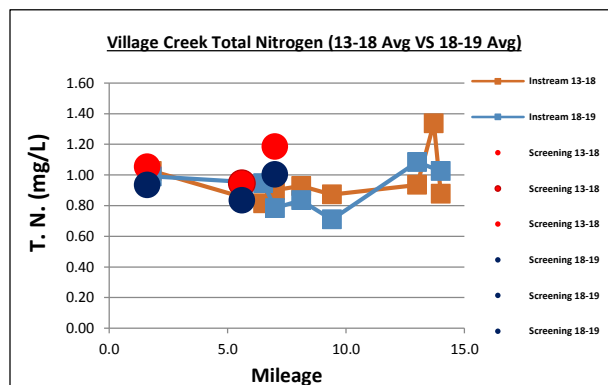


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has an electro-plating industry within the sub-basin and another electro-plating facility in the sub-basin around VIC05.6s. It is important to note that sampling for this year, zinc has not been at elevated levels in Village Creek. Zinc data is discussed more in the Anti-Degradation portion of this Report.

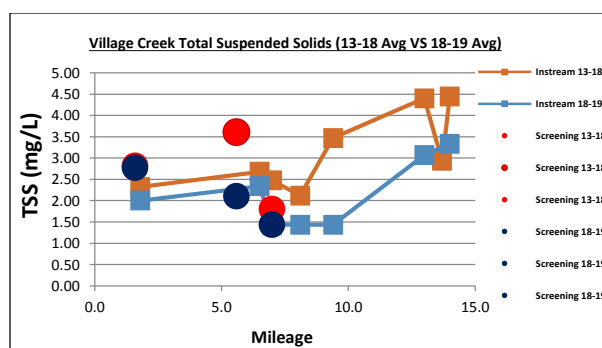


Average annual Total Phosphorus (T.P.) for 2013 -2018 (In **ORANGE**) and for 2018-2019 (In **BLUE**) is shown in the figure above. During the period 2013-2018 the average phosphorus levels remain below 0.07 mg/L while this year's data (2018-2019) indicated a slight decrease throughout the sampling sites. Monitoring at VIC07.0s will continue due to the trend of average 2013-2018 data indicating a slight increase in total phosphorus at Cotton Mill Branch and continuing to sampling site VIC09.4. Again during 2018-2019 at all sampling sites there was a slight decrease in the T.P. concentrations recorded. It is important to note that all total T.P. readings do not exceed 0.07mg/L for the average T.P. for any monitoring period.



Annual average Nitrogen was essentially the same entering the city and leaving the city this year, as well as mirroring the combined five-year average.

Total Suspended Solids (TSS) in Village Creek this year were lower in concentration than the previous five-year average of monitoring. FY 2018-2019 data showed lower than five-year average TSS levels which resulted in peaks that appeared to be a result of sampling during heavy rain events and higher velocities. TSS levels at Cotton Mill Branch (VIC07.0s) also appears to be about equal to the downstream stations at VIC07.0 but with a slight decrease. Note that for sampling period 2018-2019 and 2013-2018 average, all samples resulted in lower than 4.5mg/L TSS.





Village Creek Loading Analysis:

Total suspended solids (TSS) mass concentrations were measured from grab samples within Village Creek, placed on ice, and returned to the Birmingham Water Works Board laboratory for analysis. No flow measurements were made during this reporting period in the field; rather City Stormwater Management staff relied on continuous flow measurements afforded by two U.S. Geological Survey gages. One gage is located at 86th Street (USGS #02458148) near Roebuck Springs, the headwaters of Village Creek in Birmingham. The other is located at a railroad trestle near Pratt City (USGS #02458502). The real-time USGS data can be found on the USGS website; [USGS Water Watch](#) using the station ID's provided above. The difference between the load analyses from the two sites represents the net TSS load generated by the City's MS4 and contribution from private point sources.

Industrial point source information is included in this report only to illustrate better the contribution of the City's MS4 on the water quality in Village Creek. Therefore, industry loadings are combined into one measure. Industrial nonpoint stormwater sources may have been included this year as a point source and is delineated also as a point source of water for this report. Otherwise, those industries nonpoint stormwater sources, which may otherwise not be reported would be represented in the public MS4 system data.

Among the numerous NPDES permitted facilities in the Village Creek watershed only

those listed earlier in this report were considered for further loading consideration. Industry loading analysis was obtained from the monthly discharge monitoring reports provided to ADEM and assembled from the ADEM e-file website. Those industries included:

- ★ Nucor (Permit #AL0003735)
- ★ ACIPCO (Permit #AL0029378)
- ★ SMI (Permit #AL0001554)
- ★ Wade Sand & Gravel (Permit #AL0025194)
- ★ Birmingham Airport (Permit #ALG140453)

Industries such as McWane, Industrial Chemicals (stormwater only), and ERP Industries are not included because their discharge either no longer exists or they discharge to a different watershed.

In the City of Birmingham's Water Quality Monitoring Strategy for ADEM, October 2013, the City established a strategy to measure performance. That strategy had its basis in the ability of the City to demonstrate the reduction of annual total suspended solids loadings.ⁱⁱⁱ The total suspended solids constituent was selected as the measure of performance due to the fact that sediment loading in Birmingham is a particular stream impairment problem. To focus on reducing instream peak concentrations of total suspended solids was anticipated to result in a load reduction of solids leaving the City of Birmingham and an overall improvement of stream water quality. Similarly, to last year, the following equation

represents the formula used to compute the daily load this year:

$$Li = Qi \times Ci \times K$$

Where for the MS4:

Li = Average load in metric Tonnes per day based on USGS reported average daily discharge (cfs) and average daily mass concentration (mg/L) of a measured constituent.

Qi = Average discharge in Cubic Feet per Second (cfs) for discharges occurring concurrent with all sampling dates

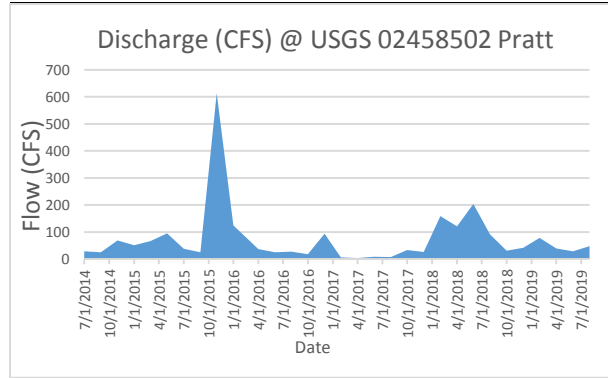
Ci = Average TSS mass concentration in mg/L for all sampling dates

K = 0.002 correction factor for unit conversion from (ft³ – mg)/ (sec – L) to metric Tonnes per day

Given the period of record now extends well beyond six-year, the decision was made to report the data as it was captured, as daily data to improve the accuracy of reporting. Furthermore, data collected from State DMR results, when reported by industry in some cases reported their flow in million gallons per day (MGD) and constituent concentrations in pounds per day. In those cases, flow was converted to cfs and constituent concentrations to mg/L and the MS4 loading formula was used.

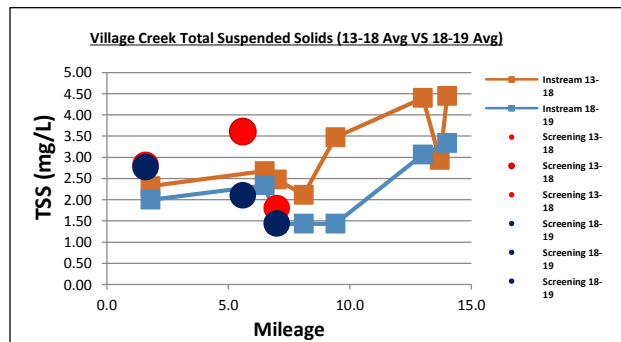
During this monitoring period flow increased substantially in late 2015 and early 2016 as a result of two large rainfall events. As was earlier discussed the period

of drought is also noticeable throughout 2016-2017 See figure below.



As also can be observed, the flows 2018-2019 has averaged below 100 cfs with limited rainfall events.

As a result, this year it has been determined that there is not a strong correlation using either the Pearson product moment ($r=0.14$) or the coefficient of correlation ($r^2 = 0.02$) between stream flow and Total Suspended Solids at Station VIC14.0 where stormwater exits the City of Birmingham. With this information it can be concluded that there are many outliers and/or more data needed.



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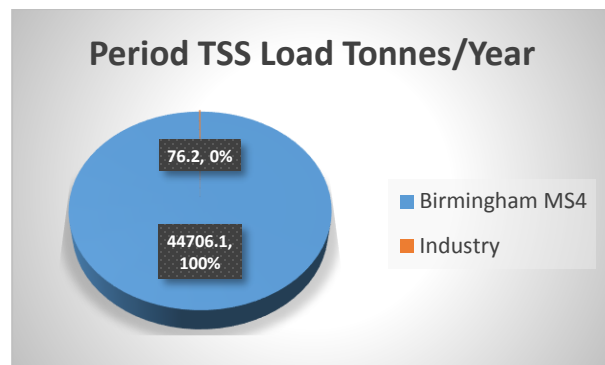
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This reporting year TSS concentrations were lower at every location than the previous five-year average.

USGS thirty-year discharge average is roughly 17 billion gallons per year at Ave W. The water entering the City from the headwaters at station VIC01.8 and the remainder of the nonpoint sources generated by the very large watershed from Birmingham covering around 30,292 acres.

Instream pollutant loadings were computed based on daily flow data collected at Stations VIC01.8 and VIC13.0 by the USGS during the same time period as water quality samples were collected. Water quality mass concentration data was also collected at the same sites every other month (i.e. once every two months). As can be seen in the figure below the City's Industry point source contribution to the average daily TSS load into Village Creek is comparatively less than the nonpoint source contribution.



The net load of Birmingham MS4 TSS data, the difference between the load at VIC13.0 and VIC1.8, was approximately 4,968.27 Tonnes/day. The net TSS load is the contribution from the 30,292-acre drainage

basin representing the City of Birmingham's nonpoint source contribution area within Village Creek. The load difference represented by this figure, when compared with last year's load is more than that of industry. The contribution from those industries considered in this report, which also provided discharge monitoring reports to ADEM, were combined together for the same time period to represent the total industry load.

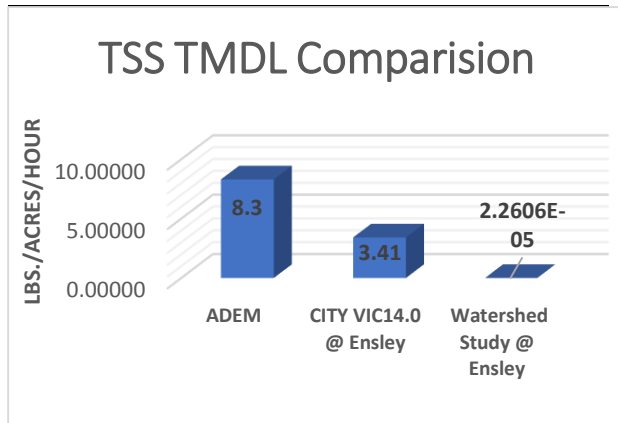
Individual contributions from industry are reported herein as the calculation of either average daily flow reported or calculated, and average daily TSS concentrations either reported or calculated from available DMR data. The represented industry contribution contained in this report does not presume these to be the only industries discharging into Village Creek. The contribution from the MS4 was considerably higher than last year while the Industry contribution was lower. Again, it is believed the additional rainfall contribution played a considerable role in these differences, among other observations.

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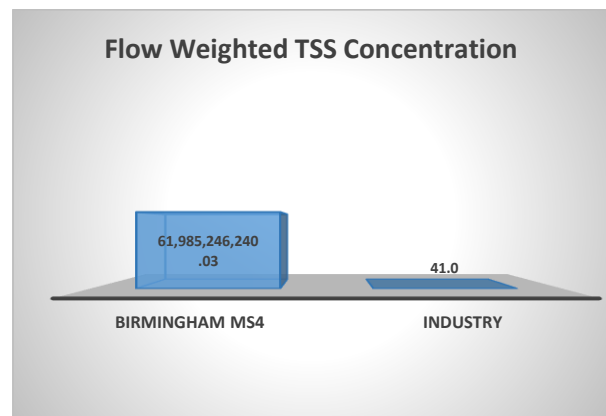


Considering the difference from last year's report wherein it was demonstrated that the MS4 was significantly different and greater than industry, the difference this year may be due to the following suggested reasons:

- ★ Industry calculations had reported unit differences, which were carefully incorporated in this year's report.
- ★ Additional data was added to last year's data set and the final units were reported as daily average rather than the annual average, which would necessarily require that data to otherwise be normalized as annual data.
- ★ Total average flow from the MS4 during this reporting period was 59.21 cfs while industry was comparatively low at 0.46 cfs. However, the TSS average concentration for the Industry was 76.2 tonnes/year while the concentration of TSS contributed by Birmingham's MS4 was reportedly higher at 160.27 tonnes/year.

- ★ Another way to consider comparative impacts on TSS load is to consider the discharge weighted load. It was demonstrated earlier that there is a relationship, now with six years of data, between TSS and flow. The figure below represents a comparison of flow-weighted TSS concentrations between Birmingham's MS4 and industry.

Overall, the City flow weighted concentration is considerably greater than that of industry.



Similarly, the City of Birmingham has also found a relationship, although weak with this year's additional data, between flow and TSS. The City agrees with ADEM that monitoring over the course of a significant rainfall event would produce useful results, if not also a demonstrable improvement and a better understanding of TSS loadings for Village Creek. The City has attempted on more than one occasion to do this analysis, however, the rainfall event failed to adequately meet sampling protocols for sampling or safety issues outweighed the ability to conduct the sampling. In the six

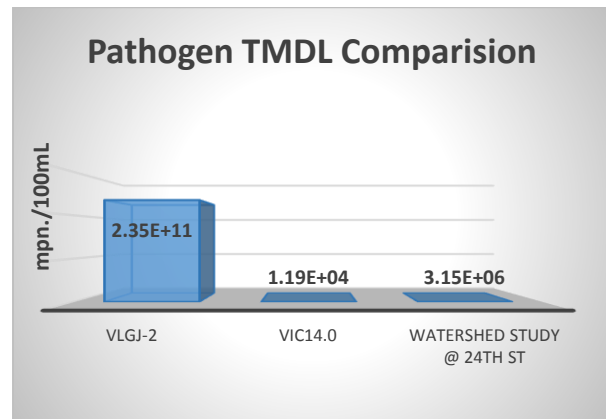


years that the City has been sampling for TSS, Stormwater Management staff has not seen the high levels of TSS similar to those levels reported earlier by ADEM.

Village Creek TMDL Analysis:

ADEM has established a TMDL for siltation in Village Creek. That document reported the allowable loading for Village Creek by NPDES regulated stormwater discharges, including MS4 discharges, to not exceed 8.3 lbs./acre/hr. This was recorded for Village Creek at Avenue “W” and was based on an area found within the ADEM TMDL of 21,440 acres. During this full period of study, The City observed a stormwater load allocation near Avenue “W: at the Pratt City Railroad Trestle (VIC14.0), just one-mile away from VIC13.0, of 3.41 lbs./acre/hr. or less than half of the state’s allocation allowance. This figure is based on the same area as was computed for ADEM’s TMDL allocation allowance. For comparison sake, the City also compared the observed waste load allocation to that reported in the City’s Village Creek Watershed Improvement Strategy for the Village Creek Watershed data reported near Ensley. Please recall that data was generated by a calibrated and verified SWMM Model. That data was more than 500 times less than ADEM’s TMDL waste load allocation at approximately 2.3E-5 lbs./acre/hr. As, seen in the chart on *page 105*, depicting TSS TMDL comparison. Decidedly though, ADEM recognizes the difficulty in coming up with one relationship of flow and TSS for Village Creek. The TMDL report contends that the events are so

dynamic that it would entail wet weather sampling through an entire hydrograph period to make any defensible correlation. ADEM recognized that there was evidence from a few samples, which exhibited high TSS concentrations during high peak flow. For the TMDL analysis and in the absence of TSS at peak flows, there was an attempt made to use the available data and derive a relationship between daily average and peak flow.^{iv}



In August 2015 ADEM established a total maximum daily load for pathogens in Village Creek. The load allocation for MS4s was identified a 2.35E+11 colonies per day and a reduction requirement of 26%. The single mass loading was established from measurements taken at VLGJ-2, which coincidentally is the same location that the City samples in Village Creek at VIC07.0.

The City computed the geometric mean concentration of E. coli at VIC07.0. The City does not collect flow data from VIC07.0 but does collect flow data near Pratt City at VIC14.0. See figure above. Therefore, to compute the load for TMDL for comparative



purposes, the flow was taken from VIC14.0 and multiplied by the area behind VIC07.0, which was computed by GIS to be 54.7%, and is assumed for this measure to be a draining basin to VIC07.0. Again, for comparison, the numbers used were discrete and not the difference between the tail water flows and the headwater flows thereby matching how the TMDL was prepared by ADEM.

The TMDL number of $2.35E+11$ was not to be exceeded. The City waste load for E. coli. was computed to be $1.19E+04$ and the results of the City's Watershed Management Plan computed the pathogen load at 24th Street (Approximately 1-Mile Downstream of VIC07.0) to be $3.16E+06$. Again, as with the TSS TMDL, the City appears to also be meeting the TMDL requirements for pathogens in Village Creek.

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Valley Creek Average Concentrations				
Year	Mileage	Sp. Cond.	TSS	E. coli
13-14	4.9s	400.4	1.4	361
	0.1s	521	3.3	1076
	2.9	479.8	1.5	159
	0	445.1	1.3	2098
14-15	4.9s	395	2.4	280
	0.1s	502.2	15.3	1433
	2.9	450	1.9	666
	0	434	42	2333
15-16	4.9s	389.6	1.2	289
	0.1s	502.1	5.2	1535
	2.9	469.6	1.4	556
	0.7	529.5	2.8	778
	0	405.1	0.8	1937
16-17	4.9s	310.4	6.3	854.2
	0.1s	352.3	10.1	1873.1
	2.9	333.2	4.7	794.6
	0.7	364.1	4.3	1119.4
17-18	4.9s	391.6	1.5	1123.4
	0.1s	453.5	9.4	1016.5
	2.9	435.1	1.5	329.1
	0.7	468.3	6.2	568.2
18-19	4.9s	378.6	2.1	1060.9
	0.1s	346.7	6.5	1726.5
	2.9	307.3	3.2	1072.0
	0.7	324.6	6.9	1519.1

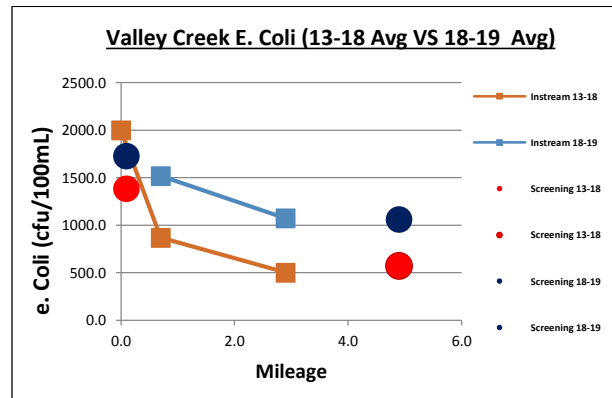
and 2.9. With the exception of the screening sites at station 0.1s and 4.9s the remainder of the creek is monitored by the Stormwater Management Authority, Inc. in the downstream portions of Valley Creek.

Monitoring results for select key parameters in Valley Creek, both instream and screening sites, are depicted in the table above for each of the last six-years.

The parameters of much concern for Stormwater Management in Valley Creek continues to be *Escherichia coli* (*E. coli*) and higher Turbidity readings. The highest levels of *E. coli* were frequently measured at Station VC0.1s (Jail Branch), and the headwaters VC0.0 monitoring station in Valley Creek at the point where the Creek daylight out from under the downtown City of Birmingham. However, the City has discontinued sampling at VC0.0 due to concerns related to mixing and to improve data consistency and has relocated the headwater station to VC0.7 at Center Street, which is downstream from the 1st tributary inflow at VC0.1s.

Valley Creek:

Valley Creek extends a distance of approximately 8.8 miles from the City of Birmingham through another jurisdiction until the Bessemer Super Highway, just outside of the City of Bessemer. The City now monitors between stream segments 0.7



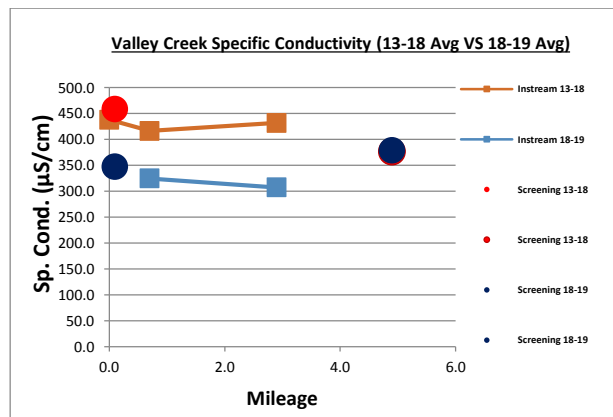
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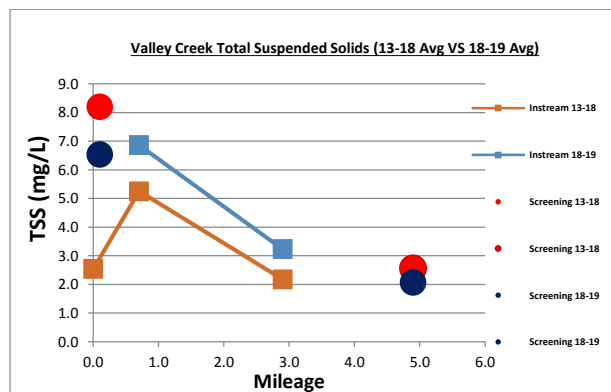
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Since 2013 and including 2019 sampling data VC0.1s was usually the highest concentration of E. coli, with a Geometric Mean averaging 654.7 mpn/100mL. In 2018-2019, VC0.1s had an average Geometric Mean of 926.6 mpn/100mL. Illicit discharges from VC0.1s continue to have high concentrations of E. coli discharging to Valley Creek sporadically without a specific known source. This may be related to leaking sanitary sewer in the area. **(Please see IDDE Section of this Report)**. Overall the data and previous graph indicates that the current year's E. coli concentration has increased above average E. coli data previously collected. The City has attempted to address the illicit discharge impacts of the homeless population and animal shelters as waste contributors to certain areas of City's MS4 in the Valley Creek watershed. The City has also worked with Jefferson County Environmental Services to address sanitary sewer overflows and will continue to work with Jefferson County to identify opportunities to further reduce E. coli when discovered.



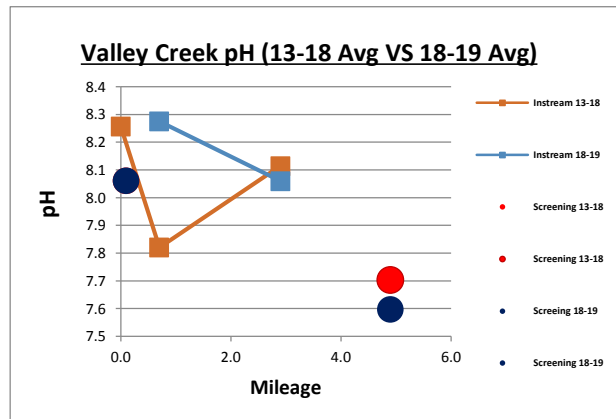
The figure above demonstrates that during the previous five-year study period sampling years average Specific Conductivity demonstrated a slightly higher reading, while this reporting year it yielded a decreasing trend across the watershed within the City of Birmingham. The City is aware of a discontinuous dry weather flow at VC0.1s associated with an Illicit Discharge and is working to identify and map the MS4 in that specific drainage basin.



Data collected during 2018-2019 indicated an increase of Total Suspended Solids concentrations above the average Total Suspended Solids concentrations in Valley Creek for the past six years, averaging 8.3 mg/L at VC0.01s. The other stations in Valley Creek over the six-year period yields an average concentration lower than 5.0 mg/L.

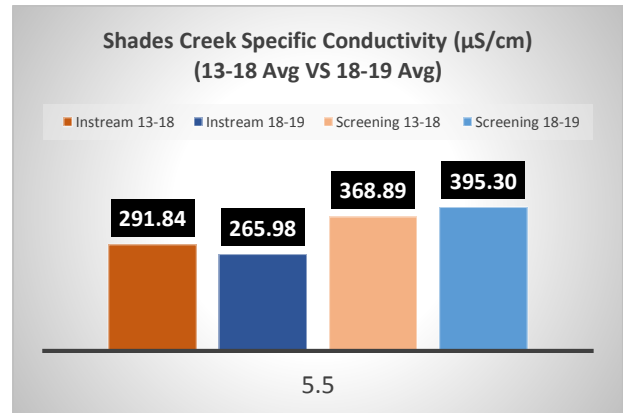
During this study period the average pH levels remained 7.45 units both instream and screening sites. During this year's study the maximum pH levels peaked around 9.3 units. Comparatively, the USGS found pH in surface waters at VAL-1 to have a median value of 7.9 units.^v Analysis of groundwater

wells in Jefferson County identified pH as having a median value of 6.8 units in the more westerly portions of Jefferson County and from the Pottsville Formation, which tends to be more acidic due to mining activity. However, samples taken from the Bangor Formation (Limestone) would tend to have more basic groundwater pH levels reflective of the eastern portions of the City and in Valley Creek.^{vi} pH has been within healthy range during the six- year reporting period.



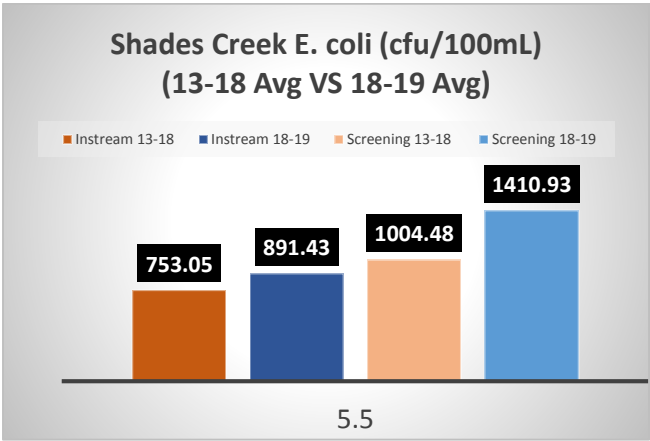
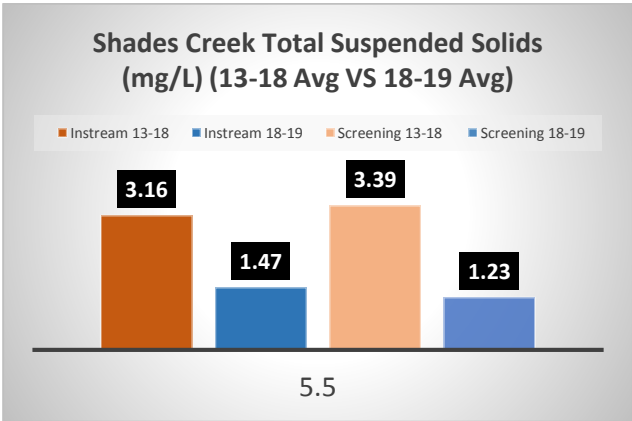
Shades Creek:

Shades Creek within the City of Birmingham extends approximately 4.5 miles. Shades Creek enters the City of Birmingham at mile 5.0 from Irondale, becoming a shared stream with the Stormwater Management Authority by mile 5.8. Ultimately, Shades Creek leaves the City of Birmingham at mile 7.2.



The City of Birmingham only samples Shades Creek at instream mile 5.5 and at a screening site at the same location (5.5s). Average specific conductance at this monitoring site during the past six years is shown. The five-year average of Specific Conductance is 368.89 µS/cm at screening site SC05.5s and 291.84 µS/cm at instream site SC05.5. This year the average specific conductance was 395.3µS/cm at screening site SC05.5s and 265.98 µS/cm at instream site SC05.5. This would leave the reader to believe that the main contributor to the increase in Conductance at this site would be from the screening outfall at SC5.5s more than the instream upstream flow at SC5.5.

Average total suspended solids at both instream and screening sites did not exceed 4.0 mg/L, and may be attributed to lower rainfall events with lower velocities during sampling periods.



Average E. coli levels yielded an increase at SC05.5s due to what we consider as an IDDE issue due to inflow from the commercial and residential areas approximately 40 square miles above the screening site. The noted **Illicit Discharge** section of 2017 annual report, discusses discharges from screening site SC05.5s which had elevated pathogens that were a result of Goo-Goo Car Wash which was discharging into the MS4. Low rainfall (near draught conditions July-September 2019) with elevated temperatures and the increase of sanitary sewer over flows has contributed to the E. coli levels being elevated this year. Continued investigations for IDDE conditions in the general area will continue in order to eliminate and reduce pathogen concentrations at this site.

Five Mile Creek
Five Mile Creek runs discontinuously through Birmingham’s city limits over the course of 8.84 miles. Monitoring Five Mile Creek is difficult due to the creek locations within the City of Birmingham relative to the points of safe access. The table below identifies those entrance and exit points. This table shows that most of the stream segments within the City of Birmingham are less than one mile in length and of the two that are greater than one mile in length, Birmingham Stormwater Management samples one of them at station 8.2 miles. As a result, there are perhaps multiple opportunities for the water quality in Five Mile Creek to be influenced by other jurisdictional inflows into the creek but cannot be safely accessed for monitoring purposes.
The figure below demonstrates the six-year reporting period for average Specific

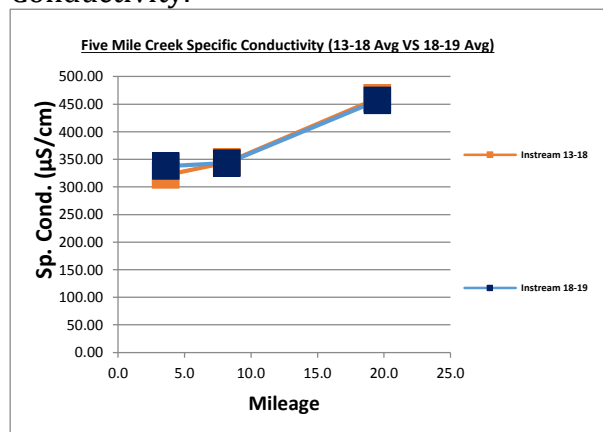
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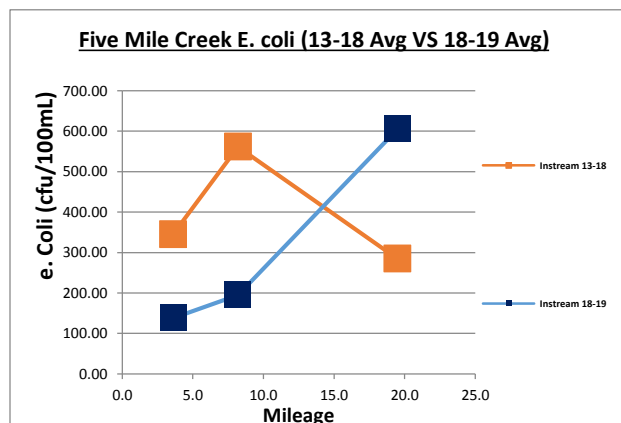
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Conductivity.

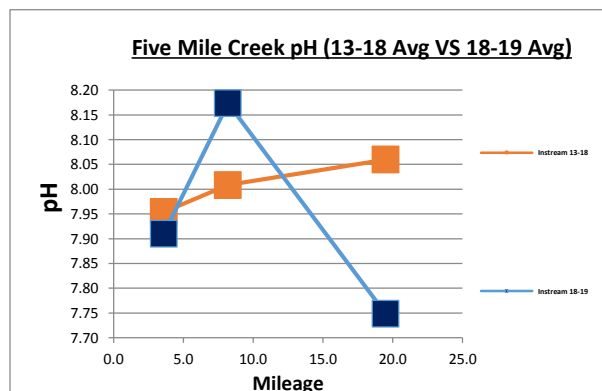


The average specific conductivity during the current reporting period in Five Mile Creek is consistent with the prior five-years prior. The trend displayed a greater specific conductivity as it exits City of Birmingham during this reporting period. Specific Conductivity remains the same compared to historic data collected starting in 2013.

Enters City (Mile Mark)	Exits City (Mile Mark)	Sample Station
3.02	3.32	-
3.59	3.85	3.60
3.91	4.83	-
5.12	5.18	-
5.26	5.29	-
5.73	5.77	-
6.03	8.44	8.20
13.46	14.01	-
14.25	15.13	-
17.21	17.43	-
17.50	19.28	-
19.30	20.64	19.50
21.14	21.19	-



Monitoring for pathogens this year demonstrated a considerable increase at FMC19.5 over the preceding five-year period. This increase was due to an illicit discharge observed at a tributary emanating from a neighboring jurisdiction upstream from the sampling site. The jurisdiction was notified of the discharge by Stormwater Personnel. Reductions in E. coli levels are shown at sampling sites FMC03.6 and FMC08.2 below the previous five-year average.



All pH unit levels remain within acceptable ranges for both previous averages and current year averages.

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Cahaba River:

The City of Birmingham only samples the Cahaba River just downstream of the confluence of the Cahaba and Little Cahaba Rivers at County Road 280. The rationale for this was reported in the Water Quality Monitoring Strategy report submitted in October 2013. In that report was mentioned that former City monitoring stations in the Little Cahaba River and Lake Purdy were being monitored by the Birmingham Water Works Board (BWVB). The table below provides a summary of that data, provided to the City by the BWVB, comparing the average concentrations of select parameters shared in common during the 2015 reporting period.

For the most part, concentrations of representative data being collected by the City at CR.280 is similar to that being collected by the BWVB at 6-sites located throughout the Cahaba and Little Cahaba River systems. The BWVB monitoring locations contained herein include:





















































- ★ CR 280
- ★ Cahaba Beach Road
- ★ I-20 East
- ★ Shepherds Branch
- ★ Sunshine Creek
- ★ Watson Branch

For as City of Birmingham and BWVB selected water quality sampling location for the Cahaba River it appears that for Nitrate, Nitrite, Total Phosphate and TSS they are comparably the same. As seen in the following table. During this same period E. coli concentration collected by the City of

Birmingham were much higher than BWVB. Even though the E. coli. Geometric Mean measured notably higher by the City than from corresponding sites measured by BWVB, the levels are not excessive and is suggestive of site conditions; developed City versus rural areas.

Parameter	2018-2019 Geometric Mean Concentration	
	City of Birmingham	Birmingham Water Works Board
Nitrate (mg/L -N)	0.37	0.61
Nitrite (mg/L - N)	<0.3	<0.3
Total Phosphorous (mg/L - P)	<0.03	<0.03
TSS (mg/L)	1.91	1.66
E. coli (mpn/100m L)	371.33	55.07

The Birmingham Water Works Board (CCR) reported pH ranged in 2018-2019 between 7.64 and 8.24 units. Average pH levels in 2018-2019 demonstrated similar results, with a minimum pH of 7.69 and a maximum pH of 8.3. This indicated that similar results continue for both the City Stormwater Management and Birmingham Water Works.

Stream	D.O. (mg/L) Min/Max	pH Units Min/Max	Temp. F ⁰ Geo- mean/Max	<i>E. coli</i> mpn/100 mL/s Geo- mean/Max	Turbidity NTU Geo- mean/Max	Zinc µg/L Geo- mean/Max
Cahaba	5.74/11.05  	7.07/7.88  	66.8/81.0  	371.3/2419.6  	13.21/70.3  	
Five Mile	6.3/11.7  	7.58/8.31  	63.11/77.3  	138.0/2419.6  	2.09/28.8  	
Village	6.63/12.1  	7.66/8.32  	65.6/78.5  	220.98/2419.6  	3.71/30.5  	13.24/74.7  
Valley	6.7/10.77  	7.45/9.3  	67/78.8  	926.6/2419.6  	17.5/387  	
Shades	4.24/12.5  	7.69/8.3  	64.6/78.8  	783.2/2420  	3.5/9.21  	

Anti-Degradation Table reflects study period 2013-2019 and 2018-2019 annual period.

Anti-degradation Analysis:

The State of Alabama has established use classifications throughout many of the City of Birmingham's stream segments. According to the EPA, a key concept in assigning designated uses is "attainability," or the ability to achieve water quality goals under a given set of natural, anthropogenic, and economic conditions with the overall success of pollution control efforts being dependent on the reliability of the

underlying designated uses in water quality standards.^{vii}

The table above provides the results of Birmingham's sampling efforts this year for five key state Anti-degradation parameters and for zinc in Village Creek alone, including:

- ★ Dissolved Oxygen (D.O.; mg/L)
- ★ pH (Units)
- ★ Temperature (F⁰)
- ★ *Escherichia coli* (*E. coli*; mpn/100mL)
- ★ Turbidity (NTU)
- ★ Zinc (µg/L) – Village Creek Only

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This table represents the level of compliance with the State's Anti-Degradation Policy for all streams within the City of Birmingham. The chart has been color coded to represent stream designated uses. In blue represents a designated use as an Outstanding Alabama Water; the tan shaded stream represents a swimming/bodily contact use; in green, those streams represent limited warm water fishery use; Valley Creek is not shaded, which is indicative of a stream with no defined designated use ([e.g. §303\(d\) list or in Chapter 335-6-11](#)). However, for reporting purposes the agriculture and industrial water supply designation is used to document compliance with state law. Where two numbers are shown, the first number is the geometric mean concentration of all instream site values, while the second number represents the highest concentration reported during the bimonthly (every two months) sampling period this year.

For each stream: red, green, and yellow color-coded boxes and circles have been added. The color-coded boxes represent the results of sampling during 2018-2019, inclusive. The color-coated circles represent the results of sampling during the period 2013-2019, inclusive. The circles and squares are colored to represent the status of adherence to select parameters defined in Chapter 335-6-10 of the "Alabama Department of Environmental Management Water Division – Water Quality Program, Water Quality Criteria" which represents the regulatory standard condition for each stream use classification. For example, if a

green box has been added the regulatory standard condition for that parameter, for that time period, was completely met for that stream designated use. A yellow box or circle means that at least a portion of the standard condition was not met for that stream designation during that representative time period. A red box or circle added means the standard condition for that parameter was not met during the course of the reporting period for which monitoring was done. The mean for each parameter represents the geometric mean as required by the Anti-Degradation Policy. Zinc levels in Village Creek are represented as the geometric mean and maximum concentration. A green box or circle represents that zinc concentrations did not exceed either the chronic or acute aquatic life criteria during that period. A yellow box or circle represents a chronic aquatic life exceedance; the red box or circle represents an acute aquatic life criteria exceedance.

This year the City has attempted to compare and contrast zinc with the pre-established Administrative Code in Village Creek; other obvious concerns appear needing further discussion. For example:

- ★ On May 15, 2019, while reviewing lab reports a sudden change in zinc results prompted a request to verify the zinc method and results of the lab analysis conducted by EnviroLab at the Birmingham Water Works. Lab results in the past two and a half years have been consistent at $<5.0\mu\text{g/L}$, however, further analysis by EnviroLab revealed that more

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detailed results were not reported to the City of Birmingham Stormwater Management. The updated zinc results were provided to Stormwater Management and the accurate data was changed and updated for this Annual Report. The updated zinc results were provided to the Water Quality Section of ADEM and reported to Compliance Section of ADEM for the City of Birmingham MS4 Permit.

- ★ City zinc data is collected and reported as total zinc, not recoverable as further defined in Section 335-6-10.07. "Alabama Department of Environmental Management Water Division – Water Quality Program, Water Quality Criteria".
- ★ Hardness is routinely analyzed by the City using test strips, which have obvious sensitivity limitations.
- ★ Hardness data reported by the City using test strips appears higher on average than that reported in literature for Village Creek. For example, the Geo-mean for City hardness was 277mg/L for the period between 2013 –2019, inclusive. According to the Water-Resources Investigations Report 02-4182 for Village Creek, the Geo-mean for hardness was calculated as being 149.8mg/L.
- ★ City is unaware if whether or not Equation #14 of the State Anti-Degradation Code, which is reported

as recoverable, can even be used for total zinc.

For comparative purposes, Anti-degradation policy equation #14 is used to define the freshwater acute aquatic life criteria and equation #15 is used to define the freshwater chronic aquatic life criteria in Village Creek. As these equations are hardness dependent, a geometric mean for hardness of 277 mg/L was used to represent the data collected between 2013 and 2019, inclusive. The geometric mean for hardness representing the period between 2018 and 2019, inclusive was 270 mg/L.

Zinc was detected in 100% of the study samples collected from October 2018 until August 2019. The maximum concentration of zinc was 74.7 µg/L at VIC5.6s on August 22, 2019. Concentrations of zinc did not exceed the acute (272 µg/L) and chronic aquatic life criteria (274µg/L) for 2018-2019FY.

Overall the pH of surface water generally ranges from 6 to 9. ADEM established a pH range of 6 to 8.5 to reduce the effects of highly acidic or highly basic water on fish and wildlife. With the exception of the Cahaba River all other streams in Birmingham had exceedances on pH greater than 8.5 units at sometime between 2013 and 2015. There were no pH values less than 6.0 units at any time in any creeks from 2016 to 2018.

Valley Creek on 2/12/2019 at VC0.7 recorded a pH of 9.3. This sample was taken during a heavy rainfall with all other Valley Creek samples for this time period

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remaining within acceptable levels. Due to the anomaly evidence no additional investigation was done on this instance.

Escherichia coli (*E. coli*) in the Cahaba River and all Creeks, the maximum concentration, were exceeded during the study period between 2013 and 2019. Valley Creek did exceed the geometric mean during this year's 2018-2019 reporting year, due to the illicit discharge at VC0.1s as previously discussed in the Water Quality summary.

Shades Creek had elevated geometric mean concentrations *E. coli* levels in June and August 2019 sampling events at SC5.5s during low flow due to lack of rainfall. During this period elevated temperatures and drought conditions were occurring, which may have contributed to these higher results.

Overall, Jefferson County Environmental Services for this year's reporting period, estimated that 2,310,545 gallons of untreated sewage made it into the four creeks and Cahaba River around and in the Birmingham metropolitan area. This information excludes estimated ground absorbed quantities.

This is an increase of 1,225,949 gallons into surrounding watersheds from last years (FY 2017-2018) reported 1,084,949 gallons. During FY 2018-2019, an estimated 1,452,215 gallons of untreated sewage was discharged into Valley Creek at various locations. An estimated 490,352 gallons of untreated sewage was discharged into Shades Creek during this same time frame. This may account for elevated *E. coli* levels

in mpn/100mL during FY 2018-2019 sampling events.

E. coli levels in Cahaba River, Village Creek and Five Mile Creek remained similar to last years reported geometric mean or the maximum concentration for the FY 2018-2019 sampling period.

Temperature levels for all creeks, at all locations in Birmingham, did not exceed state Anti-degradation regulations at any time during the study period from 2013 to 2019.

Dissolved Oxygen levels met minimum concentrations during reporting cycles from 2013 to 2019. For all streams within Birmingham, with the exception of Shades Creek which during October 2016 sampling event exhibited a low dissolved oxygen reading of 4.1mg/L. This low dissolved oxygen level was recorded during extreme drought conditions and low flow conditions, as well as, a contributing illicit discharge, that has since been eliminated.

Turbidity levels also demonstrated improvement during the entire 2013 to 2019 reporting cycle with Cahaba River and Shades Creek showing no high turbidity readings. Five Mile, Village and Valley Creeks all exhibited high turbidity readings during the 2013 to 2017 study period. With Village and Valley Creeks displaying a high turbidity reading during a substantial rainfall events with high velocity flow, for the more recent 2018 to 2019 period. Valley Creek also exhibited high turbidity readings during an illicit discharge occurring twice at



VC0.01s during sampling events for the most recent recording period 2018-2019.

It is worthy of note that hardness, pH, and recoverable zinc were not dissimilar to the findings reported by the USGS in 2000-2001 studyⁱ Higher pH levels studied during 2000-2001 along Village Creek by the USGS (USGS 2002) noted that higher pH was indicative of carbonate-based geology in the area. Valley, Village, and Five Mile Creeks originate from limestone and dolomite karst springs, which could explain some higher pH readings when the City of Birmingham conducts its water quality analysis. Sampling at the creek sources should be conducted to determine pH of the karst springs to set a bench mark to determine the amount of pH change as the creeks mix with rain, industrial sources, various soils and other conditions that effect pH.

Many natural conditions including rainfall, karst geology and carboniferous soils can affect the surface water parameters such as TSS, pH, and zinc, causing an influence on such parameters in the Valley, Village and Five Mile Creeks drainage basins. Studies on how much influence erosion and karst ground water have on TSS, pH, and zinc and the effect on the drainage basins in the Birmingham area is needed.

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Stormwater Operating Budget FISCAL YEAR 2019	
Stormwater Management Fund 048	
<u>Estimated Revenues</u>	
Stormwater Fees	<u>\$1,300,000</u>
<u>Appropriations</u>	\$264,000
Stormwater Personnel	\$688,000
General Expenses	\$876,000
Total Appropriations	<u>\$1,564,000</u>

The table above depicts the Mayor's FY 2019 budget for Stormwater Management. This represents the total cost for maintenance of the NPDES Phase I MS4 Permit.

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COMPARATIVE SUMMARY OF STRENGTHS AND WEAKNESSES

BMP Controls	Strength	Weakness	Why a Weakness?	Future Direction
Structural Maintenance		X	Found examples of failure to document and maintain detention/retention systems and the MS4 by the Departments of Public Works and/or Parks & Recreation.	Perform bi annually inspections of installed systems and meet quarterly with Leadership to address problems and better coordinate resolution. The City is also considering a SMART Maintenance System through Asset Management.
Development Planning	X			
Roadway Maintenance		X	Truck wash storm drain pollutant inserts have been designed and are awaiting funding approvals.	Use Public Works crews to limit project costs. Engineering has completed a design. Funding approval by Fleet is anticipated. Eastern Landfill truck wash is still being further considered.
Flood Management	X			
Municipal Facilities	X			
PHF	X			
IDDE	X			
Spill	X			

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COMPARATIVE SUMMARY OF STRENGTHS AND WEAKNESSES

BMP Controls	Strength	Weakness	Why a Weakness?	Future Direction
Oil & Hazardous Waste	X			
Sanitary Sewer Seepage		X	Although the City does not have a sanitary sewer system, coordination with Jefferson County to obtain annual reports has been difficult although support with IDD&E requests have been good.	Continue to seek better collaboration with Jefferson County Environmental Services.
Industrial Inspection	X			
Construction Planning	X			
Construction Inspection	X			
Education	X			
Monitoring & Screening	X			
TMDL Response	X			
Effectiveness of SWMPP	X			Implementation of SWMPP's have been achieved for Stormwater Management. Further evaluation will be planned in order to improve the programs

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ACRONYM APPENDIX

<u>Abbreviation</u>	<u>Name</u>
<i>ACES</i>	Alabama Cooperative Extension System
<i>ADEM</i>	Alabama Department of Environmental Management
<i>AEC</i>	Alabama Environmental Council
<i>AGU</i>	American Geophysical Union
<i>BBG</i>	Birmingham Botanical Gardens
<i>BFD</i>	Birmingham Fire Department
<i>BMP</i>	Best Management Practice
<i>BWWB</i>	Birmingham Water Works Board
<i>CAP</i>	City Action Partners
<i>CCR</i>	consumer confidence report
<i>CFC</i>	Chlorofluorocarbon
<i>CFM</i>	Certified Floodplain Manager
<i>CFR</i>	Code of Federal Regulations
<i>COB or City</i>	City of Birmingham
<i>CRS</i>	Community Rating System
<i>DDS</i>	Jefferson County (DDS?)
<i>DEA</i>	Drug Enforcement Administration
<i>DMR</i>	Data Migration Resources
<i>DPW</i>	Department of Public Works
<i>EPA</i>	Environmental Protection Plan
<i>EPCRA</i>	Emergency Planning and Community Right to know Act
<i>ESC</i>	Erosion and Sedimentation Control
<i>ESD</i>	Environment Services Department
<i>FEMA</i>	Federal Emergency Management Agency
<i>FIFRA</i>	Federal Insecticide, Fungicide, and Rodenticide Act
<i>FY</i>	Fiscal Year
<i>GGI</i>	Greenhouse Gas Inventory
<i>GI</i>	Green Infrastructure
<i>HBAA</i>	Home Builders of Association Alabama
<i>HEC-RAS</i>	Hydrologic Engineering Center's River Analysis System
<i>HHW</i>	Household Hazardous Waste
<i>ICLEI</i>	International Council for Local Environmental Initiatives
<i>IDD&E (IDDE)</i>	Illicit Discharge Detection and Elimination
<i>JCEMA</i>	Jefferson County Emergency Management Agency

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<u>Abbreviation</u>	<u>Name</u>
JCSWCD	Jefferson County Soil and Water Conservation District
KBB	Keep Birmingham Beautiful
LEED	Leadership in Environmental and Energy Design
LID	Low Impact Development
MEP	Maximum Extent Practicable
MGD	Million Gallons per Day
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
MSDS	Material Safety Data Sheet
NAICS	North American Industry Classification
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRDF	National Disaster Response Framework
NTU	Nephelometric Turbidity Units
ORP	Oxidation / Reduction Potential
P.L.	Per Liter
PALS	People Against a Littered State
PEP	City of Birmingham's Planning, Engineering, & Permits Department
PHF	Pesticides-Herbicides-Fertilizers
PIO	Public Information Office
PIP	Process Industry Practices
PPI	Program for Public Information
QCI	Qualified Credentialed Inspector
R&TD	Roads and Transportation Department
RLAA	Repetitive Loss Area Analysis
ROWSOPs	Right-of-way Standard Operation Procedures
SARA	Superfund Amendments and Reauthorization Act
SAT	Scholastic Assessment Test
SDS	Safety Data Sheet
SEC	Sediment and Erosion Control
SIC	Standard Industrial Classification
SMART	Specific Measurable Achievable (or attainable) Time-bound
SPCC	Spill Prevention Control and Countermeasure
SPO	Sewer Permit Ordinance
STAR	Sustainable Tools for Accessing & Rating Communities
SWMM	Storm Water Management Model

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<u>Abbreviation</u>	<u>Name</u>
<i>SWMPP</i>	Stormwater Pollution Prevention Plans
<i>T.P.</i>	Total Phosphorus
<i>TN</i>	Total Nitrogen
<i>TSS</i>	Total Suspended Solids
<i>UAB</i>	University of Alabama at Birmingham
<i>USDA</i>	United States Department of Agriculture
<i>USGBC</i>	The U.S. Green Building Council
<i>USGS</i>	U.S. Geological Survey
<i>VISTA</i>	Volunteering In Service Throughout America
<i>WLA</i>	Waste Load Allocation

ANNUAL REPORT END NOTES

i [Final Village Creek, Zinc, pH, and Siltation TMDL](#)

ii IBID. Page 81.

iii City of Birmingham. October 4, 2013. *Water Quality Monitoring Strategy for Alabama Department of Environmental Management*. Pg. 13.

iv [Final Village Creek, Zinc, pH, and Siltation TMDL, Page 18](#)

v [U.S.G.S. Water Resources Investigations Report 02-4182. 2002. Pg. 101-102](#)

vi [Geological Survey - Ground Water Availability, Jefferson County. 1990.](#)Page 14-15

vii [Basic Information: Introduction to UAAs | Use Attainability Analysis | US EPA](#)